Lockheed T-33

Airworthiness Certification

AIR-230 Airworthiness Branch
Federal Aviation Administration
Washington, D.C.
October 15 2012

Cover Photograph: USAF.
Back Cover Photograph: NASA.

Introduction – T-33 Airworthiness Certification

This document provides information to assist in the airworthiness certification and safe civil operation of a T-33 aircraft.

Attachment 1 provides a general overview of this document. Attachment 2 contains background information on the T-33 aircraft. Attachment 3 lists historic airworthiness issues with the T-33 for consideration in the certification, operation, and maintenance of these aircraft. The list is not exhaustive, but includes our current understanding of risks that should be assessed during in the certification, operation, and maintenance of these aircraft. Concerns regarding particular issues may be mitigated in various ways. Some may be mitigated via the aircraft maintenance manual(s) or the aircraft inspection program. Others may be mitigated via operating procedures i.e., SOPs) and limitations, aircraft flight manual changes, or logbook entries

Not all issues in attachment 3 may apply to a particular aircraft given variations in aircraft configuration, condition, operating environment, or other factors. Similarly, circumstances with an aircraft may raise other issues not addressed by attachment 2 that require mitigation. Attachment 4 includes additional resources and references. Attachment 5 provides some relevant T-33 accident and incident data.

Attachment 1 – Overview of this Document

Purpose

This document is to provide all those involved in the certification, operation, and maintenance of the T-33 aircraft with safety information and guidance to help assess and mitigate safety hazards for the aircraft. The existing certification procedures in FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Products, do not account for many of the known safety concerns and risk factors associated with many high-performance former military aircraft. These safety concerns and risk factors associated with many high performance former military aircraft include—

- Lack of consideration of inherent and known design failures;
- Several single-point failures;
- Lack of consideration for operational experience, including accident data and trends;
- Operations outside the scope of the civil airworthiness certificate;
- Insufficient flight test requirements;
- Unsafe and untested modifications;
- Operations over populated areas (the safety of the non-participating public has not been properly addressed in many cases);
- Operations from unsuitable airports (i.e., short runways, Part 139 (commercial) airports);
- High-risk passenger carrying activities taking place;
- Ejection seat safety and operations not adequately addressed;
- Weak maintenance practices to address low reliability of aircraft systems and engines;
- Insufficient inspection schedules and procedures;
- Limited pilot qualifications, proficiency, and currency;
- Weapon-capable aircraft not being properly demilitarized, resulting in unsafe conditions;
- Accidents and serious incidents not being reported; and
- Inadequate accident investigation data.

Research of T-33 Safety Data

The aircraft, relevant processes, and safety data are thoroughly researched and assessed. This includes-

- Aviation Safety (AVS) Safety Management System (SMS) policy and guidance;
- Historical military accident/incident data and operational history;
- Civil accident data;
- Safety risk factors;
- Interested parties and stakeholders (participating public, non participating public, associations, service providers, air show performers, flying museums, government service providers, airport owners and operators, many FAA lines of business, and other U.S. Government entities);
- Manufacturing and maintenance implications; and
- Design features of the aircraft.

This Document

The document is a compilation of known safety issues and risk factors identified from the above research that are relevant to civil operations. This document is organized into four major sections:

- General airworthiness issues (grey section),
- Maintenance (yellow section),
- Operations (green section), and
- Standard operating procedures and best practices (blue section).

This document also provides background information on the aircraft and an extensive listing of resources and references.

How to Use the Document

This document was originally drafted as job aids intended to assist FAA field office personnel and operators in the airworthiness certification of these aircraft. As such, some of the phrasing implies guidance to FAA certification personnel. The job aids were intended to be used during the airworthiness certification process to help identify any issues that may hinder the safe certification, maintenance, or operation of the aircraft. The person performing the certification and the applicant would to discuss the items in the job aid, inspect documents/records/aircraft, and mitigate any issues. This information would be used to draft appropriate operating limitations, update the aircraft inspection program, and assist in the formulation of adequate operating procedures. There are also references to requesting information from, or providing information to the person applying for an airworthiness certificate. We are releasing this document as drafted, with no further updates and revisions, for the sole purpose of communicating safety information to those involved in the certification, operation, and maintenance of these aircraft. The identified safety issues and recommended mitigation strategies are clear and can be considered as part of the certification, operation, and maintenance of the air aircraft.

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Attachment 2 —Background Information on the T-33 Aircraft

The Lockheed T-33 is a World War II, first-generation, high-performance U.S. jet fighter trainer aircraft. It was used extensively during the Cold War. The T-33 was produced under license in Canada by Canadair Ltd. and powered by Rolls-Royce Nene engines. Kawasaki Heavy Industries, Ltd. also produced the T-33 in Japan from components manufactured by Lockheed. Lockheed Martin built 5,691 T-33 aircraft, Canadair built 656, and Kawasaki built 210. The last T-33 was built by Kawasaki in 1959. The aircraft saw operational service with more than 20 foreign air forces, with several still operating the T-33.

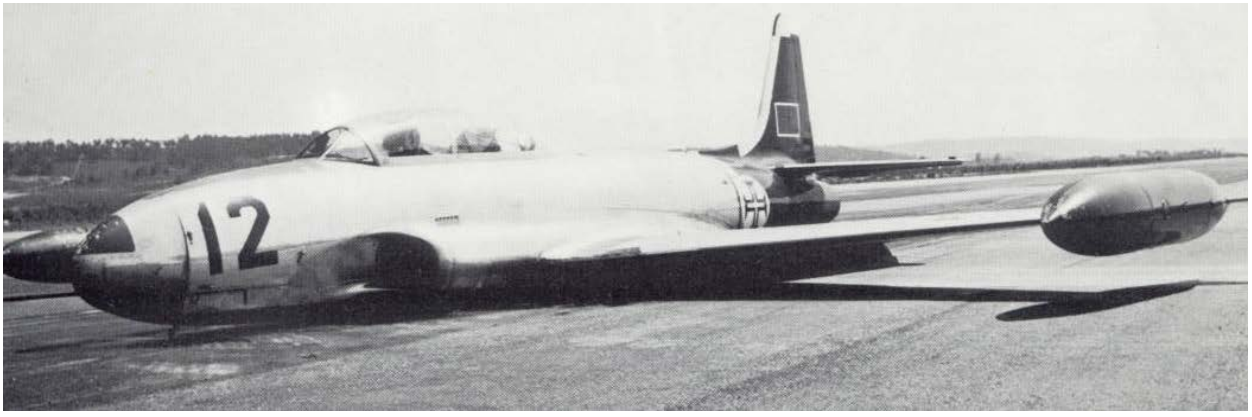
Several versions and designations of the T-33 exist, including the T-33A, AT-33, QT-33, RT-33, T-33 Mark 3 (Canadian), CT-133 (Canadian CL-30), TO-1 (U.S. Navy), TO-2, TV-2, and T2V (U.S. Navy). A total of 27 configurations exist for the T-33. T-33 engine variants depend on the aircraft's origin. T-33s delivered to the U.S. Air Force (USAF) were generally powered by the Allison J-33 engine, while Canadian versions were powered by the Rolls-Royce Nene 10 engine and French air force upgrades used the Hispano-Suiza Nene 106 engine. In addition, T-33 configurations vary in other ways, including ejection seat systems, armaments, aircraft equipment, and gross weight.

USAF T-33s in the 1970s. Source: USAF.

The Federal Aviation Administration (FAA) registry lists approximately 111 T-33 aircraft. Around 25 are believed to be active or in an airworthy condition. There is significant potential for the T-33 population to grow in the United States due to the high number of stored airframes and imports from Canada and other countries. Imports from Bolivia, the last frontline operator of the aircraft, are also possible. The actual level of airworthiness of the many T-33s flying is unknown. However, there are indications that while some owners and operators invest in operating and maintaining their aircraft, others do not.

Above, one of the civilian T-33s operating in the United States. Source: David Lednicer. Copyright © 2011. Used with permission. Below: A RCAF CT-133 used for ejection seat research. Source: RCAF.

The T-33's career has been successful in military terms, ending only recently in 2009. The aircraft's accident data record in military service shows a certain high of mechanical failures. Although many of these accidents could be classified as "typical" flight training accidents, system failures were still present, namely engine failures and in-flight fires. This is not surprising due to the aircraft's antiquated technology and the use of first-generation jet engines. To illustrate this, a 1966 USAF T-33 accident study shows that of the 114 accidents involving T-33s between 1962 and 1966, only 40 were related to pilot error.



The common T-33 gear-up landing. Source: Força Aérea Portuguesa (Portuguese Air Force).

Main T-33 Versions

- T-33A Basic Trainer Version (Most Manufactured)
- T-33B US Navy TV2 Aircraft, Re-designated T-33B in 1962
- T-33 Mk. 3 Canadian Built T-33A With Roll-Royce Nene 10 Engine
- T-33SF Standardized French AF T-33
- TF-80C Early Production Designation of T-33
- AT-33A Tactical Support Version (Armed)
- CT-133 Canadian Built T-33 Mk. 3 Modified and Later Designation
- DT-33A Drone Director
- DT-33B Drone Director, TC2-D in US Navy Service
- DT-33C Drone, TV2-KD in US Navy Service
- NT-33A Special Test Aircraft for Flight Control System Research
- QT-33A Radio Controlled Drone
- RT-33A Reconnaissance Version

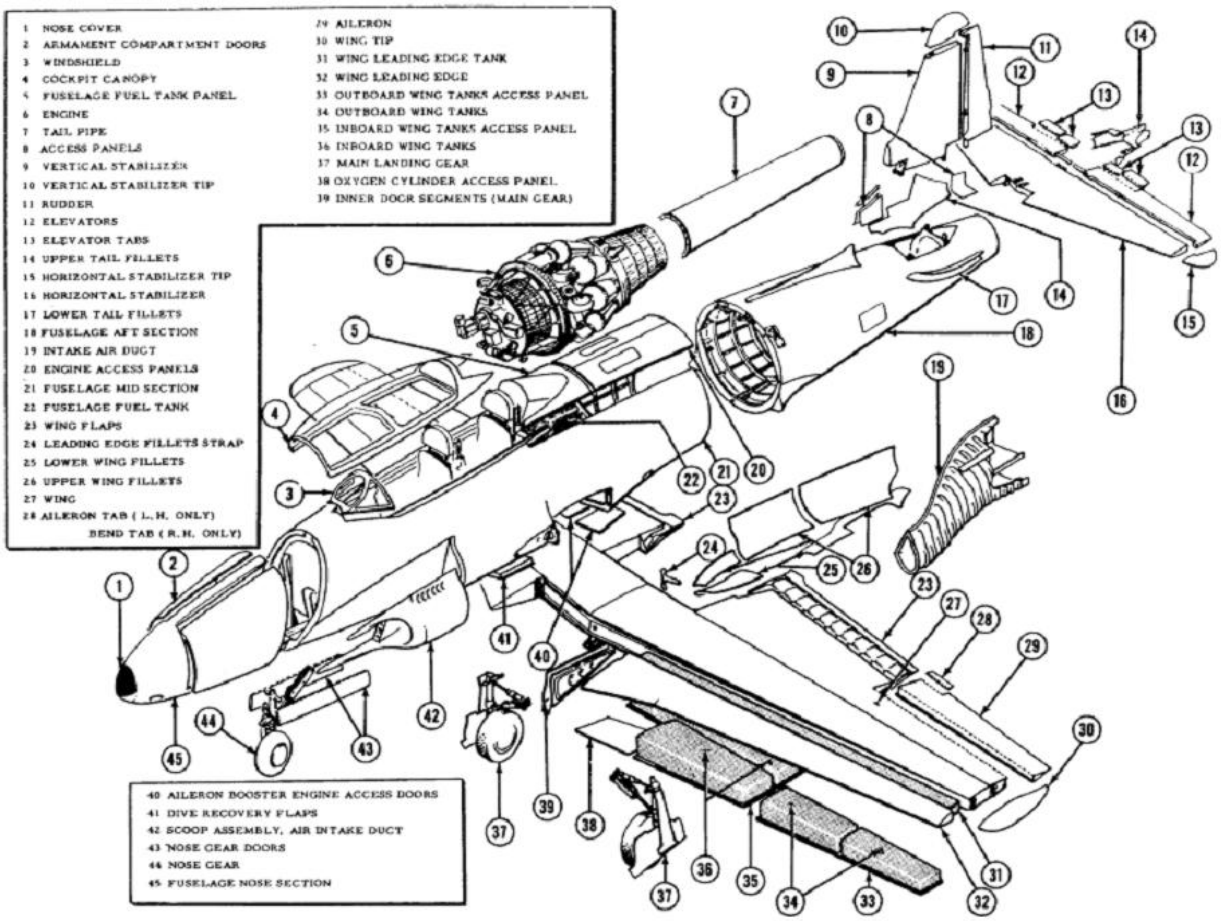
Canadian CT-133 cockpit close-up, 2008. Source: FAA.

It is estimated that of the 1,500 T-33s lost in accidents worldwide, slightly over 700 (46 percent) were lost to mechanical failure—a combination of material- and maintenance-related accidents. The aircraft achieved a class A mishap (USAF and U.S. Navy accident classification) rate of about nine accidents per 100,000 hours, with a five to seven rate in USAF service in the early 1960s. From a fleet standpoint, of the almost 6,600 T-33s produced, no less than 1,500 (23 percent) were lost in accidents. Of these, over 950 were lost by the USAF and U.S. Navy between 1948 and 1986. These are not insignificant numbers by any standard. There were differences in operational service indicating the manner in which the aircraft was operated (maintenance/operations) was related to the accident rate.

With the Dutch Air Force, the T-33 had a mixed safety record. Of the 63 aircraft received, 20 (31 percent) were lost in accidents. In Bolivian Air Force service, 11 out of the 39 T-33s operated (28 percent) were lost in accidents. In Belgian Air Force service, the fleet attrition rate was 23 percent, or 12 aircraft out of 52. In the Portuguese Air Force, 5 out of 35 T-33 aircraft (14 percent) were lost. However, that air force had an accident rate of 9.26 accidents per 100,000 hours (calculated on the basis of a total of 65,000 hours flown). The French Air Force lost 25 T-33 aircraft from a fleet of 223 between 1951 and 1980, totaling 478,118 hours. The French and Spanish air forces may have achieved the best safety record, with the aircraft at about 5 accidents per 100,000 hours.

While these accident rates are lower than the typical front line fighter of the era (20 to 30 or more class A mishaps per 100,000 hours), they are still high by today's standards, where class A mishaps of military trainers are well under 0.5 accidents per 100,000 hours. In contrast, the T-33 accident rate in U.S. civilian use from1970 to 2012 is estimated at 35 accidents per 100,000 hours. This is one the highest accident rates of any jet warbird in the FAA registry, impacting both experimental aircraft category and general aviation accident rate metrics. Therefore, in addition to mitigating known design, manufacturing, maintenance, and operational risks, the disparity between the T-33 accident rates in military and civilian use points to the need for this memo.

Source: Kurt Saxkjær. Copyright © 2011. Used with permission. www.airliners.net.



Source: Above, T-33 Mark 3 Silver Star – Airframe Training Manual RCAF, 1958. Below: RCAF.

Above, one of NASA's T-33s operated by the Flight Research Center. Source: NASA.

A **Portuguse Air Force T-33A. Source: Jorge Ruivo. Copyright © 2011. Used with permission.**

T-33s in the FAA Registry (October 12, 2012)

Manufacturer Model Code	Number of Aircraft Assigned		Manufacturer Name	Model Name
5260422	Florida	1	Lockheed/Butterworth	Butterworth Lockheed T-33
	Total	***1***		
056169A	Texas	1	Burchinal, I.N.	Burchinal T-33
	Total	***1***		
1900310	Nevada	1	Canadair	CT-33
	New Jersey	1		
	Texas	2		
	Wisconsin	1		
	Total	***5***		
05613GV	California	1	Aircraft Research Corp	Davis T-33
	Total	***1***		
05619BQ	Texas	1	Williams, Michiel R.	Lockheed/Johnson T-33A
	Total	***1***		
056090M	Colorado	1	Halladay, Roy	Lockheed T-33/Halladay
	Total	***1***		
05629Y0	Virginia	1	Shooting Star Aviation LLC	Lockheed T-33A
	Total	***1***		
0566007	California	1	Forbes	Lockheed T-33A
	Total	***1***		
5260430	***Total***	***0***	Lockheed	Lockheed T-33A
5260416	Texas	1	Lockheed/Keasler	LT-33
	Total	***1***		
05616F8	Texas	1	Hendricks-Case	MT-33
	Total	***1***		
5260404	***Total***	***0***	Lockheed	RT-33A
1901204	Arizona	1	Canadair	T-33
	California	5		
	Colorado	1		
	Delaware	1		
	Florida	2		
	Illinois	1		
	Montana	1		
	Nebraska	1		
	New Mexico	2		
	New York	1		
	Oklahoma	2		
	Tennessee	1		
	Texas	7		
	Utah	1		
	Washington	3		
	Wisconsin	1		
	Total	***31***		
5260420	Texas	1	Lockheed/Kelley	T-33A-XP
	Total	***1***		
5260403	Florida	1	Lockheed	T-33B
	Michigan	1		
	Montana	1		
	Total	***3***		
5260418	***Total***	***0***	Lockheed	T-33-MK3
05614CS	***Total***	***0***	Canadair	T-33-MK2

Manufacturer Model Code	Number of Aircraft Assigned		Manufacturer Name	Model Name
5260401	Arkansas	1	Lockheed	T-33
	California	1		
	Florida	1		
	Idaho	1		
	Illinois	1		
	Indiana	1		
	Michigan	1		
	Minnesota	1		
	New Mexico	1		
	Oregon	1		
	Texas	4		
	Utah	1		
	Wisconsin	1		
	Total	***16***		
5260402	California	6	Lockheed	T-33A
	Delaware	3		
	Florida	2		
	Georgia	1		
	Illinois	3		
	Massachusetts	1		
	Michigan	2		
	Mississippi	1		
	Missouri	1		
	Montana	1		
	Nevada	1		
	New York	1		
	Oklahoma	5		
	South Carolina	2		
	Texas	4		
	Total	***34***		
5260414	***Total***	***0***	Lockheed/Butterworth	T-33A
5260415	North Dakota	1	Lockheed/Sohnley	T-33A
	Total	***1***		
05623AS	Texas	1	Lockheed/Coleman Warbird Museum	T-33A
	Total	***1***		
05606O6	Total	***0***	Burchinal	T-33A
5260423	Minnesota	1	Lockheed/Leon	T-33A
	Total	***1***		
5260421	Florida	1	Lockheed/Wood, Charles L.	T-33A
	Total	***1***		
1900101	***Total***	***0***	Canadair	T-33A-1-LO
5260417	***Total***	***0***	Lockheed	T-33A-5-LO
05616IQ	Nevada	3	Canadair	T-33-AN MK3
	Total	***3***		
05614GW	Arizona	1	Canadair	T-33-MK3
	Delaware	1		
	New Jersey	1		
	Tennessee	1		
	Washington	1		
	Total	***5***		

Issue #	Issue(s)	Recommended Review, Action(s), and Coordination with Applicant	Notes, Action(s) Taken, and Disposition
T-33 Preliminary and General Airworthiness Inspection Issues			
1.	AVS SMS Guidance	The AVS SMS supplements the existing Code of Federal Regulations and should be used as part of the airworthiness certification process. Together, they must be the basis for, but not limited to (1) identifying hazards and making or modifying safety risk controls, which are promulgated in the form of regulations, standards, orders, directives, and policies, and (2) issuing certificates. *FAA Order VS8000.367, May 14, 2008.* SMS is used to assess, verify and controls risks, and safety risk management is integrated into applicable processes. Appropriate risk controls or other risk management responses are developed and are employed operationally. Safety risk management provides for initial and continuing identification of hazards and the analysis and assessment of risk. FAA provides risk controls through activities such as the promulgation of regulations, standards, orders, directives, advisory circulars, and policies. Such as safety risk management process (1) describes the system of interest, (2) identifies the hazards, (3) analyzes the risk, (4) assesses the risk, and (5) controls the risk. *FAA Order VS8000.369, September 30, 2008.*	
2.	Aircraft Familiarization	Become familiar with the aircraft before initiating the certification process. One of the first steps in any aircraft certification is to become familiar with the aircraft in question, in this case the T-33. Such knowledge, including technical details, is essential to establish a baseline as the certification process moves forward.	
3.	Preliminary Assessment	Conduct a preliminary assessment of the aircraft to determine condition and general airworthiness.	
4.	Condition for Safe Operation	This is an initial determination by an FAA inspector or authorized Representative of the Administrator that the overall condition of an aircraft is conducive to safe operations. This refers to the condition of the aircraft relative to wear and deterioration. The FAA inspector will make an initial determination as to the overall condition of the aircraft. The aircraft items evaluated depend on information such as aircraft make, model, age, type, completeness of maintenance records of the aircraft, and the overall condition of the aircraft.	
5.	Denial	If the aircraft does not meet the certification requirements and the special airworthiness certificate is denied, the FAA will provide a letter to the applicant stating the reason(s) for denial and, if feasible, identify which steps may be accomplished to meet the certification requirements. Should this occur, a copy of the denial letter will be attached to FAA Form 8130-6 and forwarded to AFS-750, and made a part of the aircraft's record.	
6.	Potential Reversion Back to Phase I	Notify the applicant that certain modifications to the aircraft will invalidate Phase II. These include: (a) structural modifications, (b) aerodynamic modifications, including externally mounted equipment except as permitted in the limitations issued, and (c) change of engine make, model, or power rating (thrust or horse power). The owner/operator may return the aircraft to Phase I in order to flight test specific items as required. However, major modifications such as those listed above may require new operating limitations.	
•	T.O. 00-5-1 AF Technical Order System	Become familiar with T.O. 00-5-1 AF technical Order System, May 1, 2011. This document provides guidance in the USAF TO system, which guides much of the documentation associated with the T-33 aircraft. Note: NATO uses a similar system.	
7.	Identify T-33 Version and Sub-Variants	Identify the specific T-33 version being certificated. There are major differences among T-33 aircraft, not just in terms of engines but major systems and design features, especially the Canadian types. Note: The differences between the standard USAF T-33 and the Canadian T-33 are so great that many air forces that operated both types either prematurely retired one type (for example, the Portuguese Air Force) or significantly upgraded and modified their fleet for standardization purposes (for example, the French Air Force).	
8.	Major Structural Components	Ask the applicant to identify and document the origin, condition, and traceability of major structural components. Regardless of these factors, all parts should be inspected upon installation for condition and suitability.	
9.	Airframe and Engine Data	Applicants should provide the following: Airframe: import country, N-Number, manufacture year and serial number, airframe time, and airframe cycles. Engine: manufacture date and serial number, overhaul data and location, serial number, and engine time, cycles, and date(s).	

Issue #	Issue(s)	Recommended Review, Action(s), and Coordination with Applicant	Notes, Action(s) Taken, and Disposition
10.	Aircraft Records	Request and review the applicable military and civil aircraft records, including aircraft and engine logbooks. Canadian examples include: CF 351, Airframe Time and Landing Record; CF 349, Aircraft Unserviceability Record; CF 343, Aircraft / Engine Second Level Inspection Record and Certificate; T-33 damage records; T-33 flight time records; and Canadian Forces Technical Order (CFTO) C-12-133-000/ICF-000, Canada Aircraft Operating Instructions (refer to *Royal Canadian Air Force (RCAF) Modifications and Leaflets (CFTO C-12-133-000/ICF-000 for Canadian T-33 Mk.3 and CT 133)* below).	
11.	Royal Canadian Air Force (RCAF) Modifications and Leaflets (CFTO C-12-133-000/ICF-000 for Canadian T-33 Mk.3 and CT-133)	Discuss this document with the applicant. Having this document eliminates much research about the aircraft and its condition. The RCAF kept good records on their aircraft, including listings of all modifications and leaflets covering the period from June 1954 to the date of disposal. The total number of modifications is approximately 730, and removing all non-applicable items such as armament, weapons, and avionics, the listing is reduced to approximately 359.	
12.	Canadian Armed Forces Aircraft Condition and Inspection Reports for Disposed T-33 Aircraft	In cases involving Canadian aircraft, ask for a copy of appendix D to CF 336, Aircraft Condition and Inspection Report. This report was issued with the aircraft when sold by the Canadian Armed Forces. This establishes a baseline for the restoration.	
13.	FAA Records Review	Review the existing FAA airworthiness and registration files (in the FAA Electronic Document Retrieval System) and search the Program Tracking and Reporting Subsystem (PTRS) for safety issue(s) and incidents. Note: Many of the T-33s disposed by the USAF and donated to trade schools and other civilian institutions were required to acquire FAA registration even though the aircraft were not kept in an airworthy condition nor expected to be returned to flight status.	
14.	FAA Form 8100-1	Use FAA Form 8100-1 to document the airworthiness inspection. Using this form facilitates the listing of relevant items to be considered, those items' nomenclature, any reference (that is, NAVAIR manual; FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Products; regulations) revision, satisfactory or unsatisfactory notes, and comments. Items to be listed include but are not limited to— 1. FAA Form 8130-6; 2. § 21.193 of Title 14 of the Code of Federal Regulations (14 CFR); 3. FAA Form 8050-1; 4. 14 CFR § 45.11(a); 5. FAA Order 8130.2, paragraphs 4002a(7) and (10), 4002b(5), 4002b(6), 4002b(8), 4111c, 4112a(2); 6. 14 CFR § 91.205; 7. § 91.417(a)(2)(i), airframe records and total time, overhaul; and 8. § 91.411/91.413, altimeter, X-ponder, altitude reporting, static system test.	
15.	Functionality Check	Ask the applicant to prepare the aircraft for flight, including all preflight tasks, startup, run-up, and taxi.	

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16.	Adequate T-33 Manuals and Related Documentation	Ensure the existence of a complete set of the applicable T-33 manuals such as flight manuals, inspections and maintenance manuals, and engine manuals. This is the applicant/operator's responsibility. An operator must also have the applicable technical orders (TO) to address known issues related to airworthiness, maintenance, and servicing. Examples include: • *Handbook Flight Operating Instructions USAF Series T-33A Aircraft (AN 01-75FJC-1)* • *Lockheed T-33 A TV-2 Aircraft Flight Handbook Manual, TO 0T-33A-1 AN 01-75FJC-1 (1955)* • *Lockheed T-33 A TV-2 Aircraft Parts Catalog Manual, TO 0T-33A-4 AN 01-75FJC-4 (1955)* • *Lockheed T-33 A Aircraft List of Applicable Publication Manual, TO 0T-33A-01 (1957)* • *Lockheed T-33 A Aircraft Service Bulletin Collection Publication Manual (1957), Lockheed T-33A - RT-33A Aircraft Handbook Inspection Requirements Manual* • *TO 0T-33A-6 (1956), Lockheed T-33A -1,-5, -10 -15 Aircraft Maintenance Manual, TO 0T-33A-2 (1959).* Urgent Action Time Critical Technical Orders (TCTO) are also applicable. Royal Canadian Air Force T-33/CT-133 guidance includes: • Aircraft Operating Instructions for the Silver Star, Canadian Department of National Defense, 1996; • CFTO C-12-133-000/MB-000, Canada Aircraft Operating Instructions, dated January 27, 1995; • Flight Reference Cards RCAF CFP149 (3); • CFTO C-12-133-00/NR-000, T-33 Mark 3 Silver Star Aircraft Training Manual; • Engineering order (EO) 05-50C-2, Aircraft Maintenance Procedures; • EO 05-50C-8, Weight and Balance; • EO 05-50C-3, Structural Repair Manual; • EO 05-50C-4, Aircraft Parts Manual; • EO 10B-15B-2, Nene 10 Maintenance Manual; EO 10B-15B-4, Nene 10 Parts Manual; • RCAF T-33 Quality Work Instruction Manual; • T-33 Equipment Checklist, L-12-133-000/LC-000; T-33 Silver Star Departure Checklist; and • CFTO C-12-133-ODO/MF001, Tip Tanks Maintenance. J-33 and Nene 10 engines guidance includes: • TO 2J-J33-6, J33-A-33, -33A, -35 Field Maintenance Manual, dated 1960; • TO 2J-J33-23, J33-A-33, -33A Overhaul Instruction Manual, dated 1954; • TO 2J-J33-13, J33-A-35 Service Instruction Manual, dated 1957 • TO 2J-J33-14, J33-A-35 Illustrated Parts Breakdown Manual, dated 1958; • TO 2J-J33-3, J33-A-9 Overhaul Instruction Manual, dated 1953; • J33-A-33, -35 Service Training Manual; and • Rolls-Royce Nene Overhaul Manual (R-R TSD Publication 286).	
17.	Availability of Documents Listed in Lockheed T-33 Aircraft List of Applicable Publication Manual	Review the aircraft inspection program (AIP) to verify compliance with the applicable version of TO 0T-33A-01, Lockheed T-33A Aircraft List of Applicable Publication Manual. This document contains the applicable T-33 TOs. Note: Where applicable, equivalent Canadian Armed Forces documents such as engineering orders are acceptable.	
18.	Applicant/Operator Capabilities	Review the applicant/operator's capabilities, general condition of working/storage areas, availability of spare parts, and equipment.	

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19.	Scope and Qualifications for Restoration, Repairs, or Maintenance.	Familiarize yourself with the scope of the restoration, repairs, and maintenance conducted by or for the applicant.	
20.	Operational Risk Management (ORM)	Recommend the T-33 owner/operator implement an ORM-like approach. ORM employs a five-step process: (1) Identify hazards, (2) Assess hazards, (3) Make risk decisions, (4) Implement controls, and (5) Supervise.	
21.	Limiting Duration of Certificate	Refer to § 21.181 and FAA Order 8130.2 regarding **t**he duration of certificates, which may be limited. An example would be to permit operations for a period of time to allow the implementation of a corrective action or changes in limitations. In addition, an ASI may limit the duration if there is evidence additional operational requirements may be needed at a later date.	
22.	Compliance With § 91.319(a)(1)	Inform the operator operations of the aircraft are limited under this regulation. The aircraft cannot be operated for any purpose other than the purpose for which the certificate was issued. For example, in the case of an experimental exhibition certificate, the certificate can be used for air show demonstrations, proficiency flights, and flights to and from locations where the maintenance can be performed. Such a certificate is NOT IN EFFECT for flights related to providing military services (that is, air-to-air gunnery, target towing, electronic countermeasures (ECM) simulation, cruise missile simulation, and air refueling). Also refer to *Military/Public Aircraft Operations* below.	
23.	Multiple Certificates and Public Aircraft Operations, That Is, U.S. Department of Defense (DOD) Contracts. Also Refer to *Military Operations* Below.	In those cases involving multiple airworthiness certificates, the applicant must submit information describing how the aircraft configuration is changed from one to the other. This is important because, for example, some research and development (R&D) activities may involve equipment that must be removed to revert back to the exhibition configuration. Moreover, the procedures should provide for any additional requirement(s), such as additional inspections, to address situations such as high-G maneuvering that could have an impact on the aircraft and/or its operating limitations. Similarly, removing equipment that could be considered part of a weapon system may be required (refer to *Demilitarization* below). All applications for an R&D certificate must adhere to FAA Order 8130.29, Issuance of a Special Airworthiness Certificate for Show Compliance and/or Research and Development Flight Testing. A similar process should be identified to revert back from public aircraft operations.	
24.	Demilitarization	Verify the aircraft has been adequately demilitarized. Originally, all T-33As had a fixed armament of two .50 caliber machine guns in their nose. Removal of the guns (especially in AT-33s) alone does not suffice. Wiring, switches, and other subsystems need to be disabled as well. Depending on the version or variant, weapon systems and related equipment installed in the T-33 include ranging radar, SUU-21 bomb dispenser and training bombs, chaff/flares systems, ECM/Jammer gear (such as ALQ-51, ALQ-126, Sanders ALQ-132, Xerox ALG-123, ALQ-167, AST-4, ALQ-119, ALQ-131), LGBTR (Laser Guided Bomb Training Round), AN/ALE-40 system, and the AN/ALR-56 radar warning receiver (RWR), With these systems, there are many safety issues that can preclude a finding of "condition for safe operation," and "protecting people and property on the ground," as required by statute and regulations. These safety issues include accidental firing, compartment fires, inadvertent discharge of flares, toxic chaff, electrical overloads of the aircraft electric system, danger of inadvertent release, structural damage to the aircraft, complex flight limitations, and harmful emissions. For additional information on what items and components are part of the aircraft's weapon systems, refer to TO 1T33-34-1-1 and related weapons delivery manual. Also, there is data indicating that the USAF may have published a TO specific to the T-33 and dealing with demilitarization. Note: Some of these weapon systems could be permitted for a R&D airworthiness certificate, but the related safety issues still have to be addressed, especially if the aircraft reverts back to an exhibition certificate. TO 00-80G-1, Make Safe Procedures for Public Static Display, dated November 30, 2002, can be used as a reference as well.	

Issue #	Issue(s)	Recommended Review, Action(s), and Coordination with Applicant	Notes, Action(s) Taken, and Disposition
25.	Federally Obligated Airport Access	Inform the operator T-33 operations may be restricted by airports due to safety considerations. As provided by Title 49 of the United States Code (U.S.C.) § 47107(a), a federally obligated airport may prohibit or limit any given type, kind, or class of aeronautical use of the airport if such action is necessary for the safe operation of the airport or necessary to serve the civil aviation needs of the public. Additionally, per FAA Order 5190.6, FAA Airport Compliance Manual, the airport should adopt and enforce adequate rules, regulations, or ordinances as necessary to ensure safety and efficiency of flight operations and to protect the public using the airport. In fact, the prime requirement for local regulations is to control the use of the airport in a manner that will eliminate hazards to aircraft and to people on the ground. In all cases concerning airport access or denial of access, and based on FAA Flight Standards Service safety determination, FAA Airports is the final arbiter regarding aviation safety and will make the determination (Director's Determination, Final Agency Decision) regarding the reasonableness of the actions that restrict, limit, or deny access to the airport (refer to FAA Docket No. 16-02-08, FAA v. City of Santa Monica, Final Agency Decision, FAA Order 2009-1, July 8, 2009; and FAA Docket No. 16-06-09, Platinum Aviation and Platinum Jet Center BMI v. Bloomington-Normal Airport Authority).	
26.	Environmental Impact (Noise)	Inform the operator T-33 operations may be restricted by airport noise access restrictions and noise abatement procedures in accordance with 49 U.S.C. § 47107. As a reference, refer to FAA Order 5190.6.	
27.	Other Federal Requirements	Ensure owners/operators familiarize themselves with directives from various government agencies. FAA regulations primarily have to do with aircraft certification and airworthiness standards pertaining to safe operation in U.S. airspace. While other agencies such as DOD, Department of Alcohol Tobacco, and Firearms (ATF), and Department of Homeland Security (DHS) have jurisdiction over import requirements, illegal substances, protection and other matters of national defense. As circumstances dictate constant vigilance and regulatory changes, it is the owner/operator's responsibility for compliance.	
28.	Operations Overseas	Inform the applicant/operator that T-33 operations may be restricted and permission must be granted by foreign civil aviation authorities (CAA) within the scope of ICAO's Article 40. The applicable CAA may impose any addition limitation as it deems necessary, and may expand upon the restrictions imposed by the FAA on the aircraft. In line with existing protocols, the FAA will provide the foreign aviation authority with any information, including safety information for consideration in evaluating whether to permit the operation of the aircraft in their country, and if so, under what conditions and/or restrictions. It is also noted that any operator offering to use a U.S. civil aircraft with an experimental certificate to conduct operations such as air-to-air combat simulations, electronic counter measures, target towing for aerial gunnery, and/or dropping simulated ordinances pursuant to a contract or other agreement with a foreign government or other foreign entity would not be doing so in accordance with any authority granted by the FAA as the State of Registry or State of the Operator.	

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T-33 Maintenance Manual(s), Aircraft Inspection Program (AIP), and Servicing			
29.	Changes to Aircraft Inspection Program (AIP)	Consider whether the FAA-accepted AIP is subject to revisions to address safety concerns, alterations, or modifications to the aircraft. Section 91.415, Changes to Aircraft Inspection Programs, requires that "whenever the Administrator finds that revisions to an approved aircraft inspection program under § 91.409(f)(4) or § 91.1109 are necessary for the continued adequacy of the program, the owner or operator must, after notification by the Administrator, make any changes in the program found to be necessary by the Administrator."	
30.	Maintenance Practices	In addition to any guidance provided by the manufacturer/military service(s) (for example, the Lockheed T-33A and RT-33A USAF 1956 Structural Repair Handbook)), consider Advisory Circular (AC) 43.13-2, Acceptable Methods, Techniques, and Practices - Aircraft Alterations, and AC 43.13-1, Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair, to verify safe maintenance practices.	
31.	Qualifications for Inspections	Ensure only FAA-certificated mechanics with appropriate ratings as authorized by 14 CFR § 43.3 perform inspections.	
32.	Late Canadian Maintenance and Upgrades	Ask the applicant if the aircraft was maintained and/or overhauled by Kelowna Flightcraft (KFC) in British Columbia, Canada and /or Canadian Armed Forces Aircraft Upgrade Program (AUP). Canadian Forces T-33s were maintained and upgraded by that company. Canada's Forces T-33s were well maintained and upgraded by KFC and many of these aircraft are now in the U.S. Many may also have had the AUP upgrade as well. This is a benefit in terns of airworthiness since KFC used the latest T-33 maintenance standards. Note: KFC also performed similar upgrades to the Bolivian Air Force T-33s. Bolivian AF numbers include: FAB 606, 607, 610, 612, 614, 620, 621, 623, 625, 626, 627, 628, 631, 634, 635, 636, 637, and 639.	
33.	First-to-Third Maintenance Program	Ask the applicant if the aircraft is or has been maintained and inspected under a Canadian first-to-third maintenance program. This not only provides a historical baseline for any review, but also provides a starting point for future operations. For example, the First Level Maintenance Inspections are primarily servicing inspections, which are carried out in accordance with CFTO C-12-133-00/NR-000. The principle servicing inspections are: 1 - Before Flight Check "B" Check, 2 - After Flight Check "A" Check, 3 - Quick Turn Check "AB" Check; and 4 - Primary Inspection (PI) (every 25+/- 5 flying hours).	
34.	Modifications	Per § 21.93, verify major changes do not create an unsafe condition and determine whether new operating limitations will be required. The information contained in appendix A to part 43 can be used as an aid.	

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35.	Adequate Maintenance Schedule	Ensure the AIP follows USAF/U.S. Navy/Canadian Armed Forces requirements as appropriate concerning inspections (that is, if aircraft is a Canadian aircraft, then Canadian Armed Forces guidance applies instead of the USAF guidance). Refer to *T-33 Inspection Program(s)* below. A 100-hour, 12-month inspection program under appendix D to part 43 is generally not adequate for sophisticated aircraft like the T-33. For example, concerning Canadian T-33 Mk.3 aircraft, the RCAF inspection requirements (airframe) and tasking sheets must be obtained. Inspection manual reference CFTO C-12-133-000/NE-000 can be summarized as follows: • Primary inspections every 25 flying hours. • Periodic inspections every 300 hours plus or minus 30. • Work cards for the periodic inspections (Nos. 1 through 4) for applicability. • For future maintenance, perform a primary inspection during the year if 25 hours are achieved, or after 6 months calendar time. Thereafter— o Perform periodic inspection No. 2 at year one. o Perform periodic inspection No. 3 at year two. o Perform periodic inspection No. 4 at year three. o Incorporate inspections and military equivalent of service bulletins (TOs) in the periodic service cards. Note: Because of specific levels of readiness to meet operational requirement, some operators modify these maintenance practices. For example, all elements of the 25 hour inspection may be incorporated into a preflight inspection check.	
36.	T-33 Inspection Program(s)	Review the AIP for compliance with the applicable USAF/Canadian Armed Forces guidance such as TO 0T-33A-6, Lockheed T-33A - RT-33A Aircraft Handbook Inspection Requirements Manual (1956) or any subsequent -6-1 type document. This is important when developing an inspection program under § 91.409. The inspection program must comply with both hourly and calendar inspection schedules. The only modifications to the military AIP should be related to the removal of military equipment and weapons. Deletions should be properly documented and justified.	
37.	Prioritize Maintenance Actions	Recommend adopting a risk management system that reprioritizes high-risk maintenance actions in terms of (a) immediate action, (b) urgent action, and (c) routine action. Also refer to *Recordkeeping, Tracking Discrepancies, and Corrective Action* below.	
38.	Recordkeeping, Tracking Discrepancies, and Corrective Action	Check applicant recordkeeping. The scope and content of §§ 43.9, 43.11, and 91.417 are acceptable. The USAF Form 781 process or the U.S. Navy's Maintenance Action Form (MAF) process will assist with recordkeeping and help verify acceptable level of continued operational safety (COS) for this type of aircraft. Three types of maintenance writeups can be found inside USAF Form 781: (1) an informational, that is, a general remark about a problem that does not require mitigation; (2) a red slash for a potentially serious problem; and (3) a red "X" highlighting a safety of flight issue that could result in an unsuccessful flight and/or loss of aircraft—no one should fly the aircraft until the issue is fixed. For more information on recordkeeping, refer to AC 43-9, Maintenance Records. All discrepancies should be reviewed by the flight crew before and after each flight. Test flights should be required for any discrepancy to which the corrective action may constitute a risk to flight or needs to be validated in flight by a pilot.	
39.	Qualifications of Maintenance Personnel	Check for appropriate qualifications, licensing, and type-specific training of personnel engaged in managing, supervising, and performing aircraft maintenance functions and tasks. The National Transportation Safety Board (NTSB) has found the use of noncertificated mechanics with this type of aircraft has been a contributing factor to accidents. Recommend only FAA-certificated repair stations and FAA-certificated mechanics with appropriate ratings as authorized by § 43.3 perform maintenance on this aircraft.	
40.	Ground Support, Servicing, and Maintenance Personnel Recurrent Training	Recommend regular refresher training be provided to ground support, servicing, and maintenance personnel concerning the main safety issues surrounding servicing and flight line maintenance of the T-33. Such a process should include a recurrent and regular review of the warnings, cautions, and notes listed in TO 1T-33-2-1, Technical Manual General Airplane.	
41.	Parts Storage and Management and Traceability	Recommend establishing a parts storage program that includes traceability of parts. Note: Some T-33 operators' maintenance plan includes copies of the forms used for part tractability and status of parts.	

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42.	Maintenance Records and Use of Tech Data	As required by FAA Order 8130.2, conduct a detailed inspection of maintenance records. Verify maintenance records reflect inspections, overhauls, repairs, time-in-service on articles, and engines. Ensure all records are current and appropriate technical data is referenced. This should not be a cursory review. Maintenance records are commonly poor/incomplete for imported aircraft. Refer to *Adequate T-33 Manuals and Related Documentation* above.	
43.	"On Condition" Inspections	If "on condition" inspections are considered, adhere to the military/manufacturer program and/or provide adequate data to justify that practice for the applicable part or component. On condition is a preventive primary maintenance process. It requires that an appliance or part be periodically inspected or checked against some appropriate physical standard/parameters to determine whether it can continue in service. The purpose of the standard is to remove the unit from service before (not after) failure during normal operation occurs. "On condition" must reference an applicable standard (that is, inspect the fuel pump to an acceptable reference standard, not just "it has been working so far"). Each "on condition" inspection must state acceptable parameters. In some cases, such as in those involving fuel pumps, an "on condition" inspection (to a standard) might be appropriate. One T-33 operator has reported fuel pumps failing at any point from 4 hours to over 700 hours after overhaul. This operator notes that pulling a fuel pump out at specified interval would be counterproductive because it inspects fuel pumps "on condition," and failed fuel pumps are sent out for overhaul and received back with an FAA Form 8130. In another example, the T-33 aileron boost is to be replaced at 600 hours and if an "on condition" alternative were to be considered, the applicant must provide the technical documentation substantiating that alternative as an equivalent level of safety. "On condition" inspections are not appropriate for all parts and components. Note: Overhaul refers to the process of disassembling, cleaning, inspecting, repairing as necessary, reassembling, and testing for approval for return-to-service within the specifications of the manufacturer's overhaul data.	
44.	Airframe, Engine, and Component Replacement Intervals	Verify compliance with required replacement intervals as outlined in appropriate inspection guidance such as TO 0T-33A-6, Lockheed T-33A - RT-33A Aircraft Handbook Inspection Requirements Manual (1956) (or equivalent Canadian Armed Forces guidance), and related engine documentation such as Rolls-Royce Nene Mk. 10 Engine Life Limits, dated October 11, 2002. For example, the T-33 airframe was delivered with a 4,000-hour limit. A review of several RCAF CF 336 documents lists many T-33 components as time-expired, including fuel boost pumps, oxygen regulators, turbine assemblies, voltage regulators, and initiators. If components are not replaced per the manufacturer's requirements, ask for data to justify extensions. Applicants should establish and record time in service for all life-limited components and verify compliance with approved life limits. Set time limits for overrun of intervals and track cycles. Evaluate any overruns of inspection or maintenance intervals. If inspections or maintenance are overrun, a Special Flight Permit may be requested to fly the aircraft to a location where maintenance can take place.	
45.	Quality Work Instruction Manual	The use of the RCAF T-33 Quality Work Instruction Manual, dated July 14, 2000, covering inspection, testing, and aircraft departure checks, is recommended. Note: Some operators develop their own quality, FOD, and aircraft maintenance processes.	
46.	Inspect and Repair as Necessary (IRAN)	If IRAN is proposed, verify it is detailed and uses adequate technical data (that is, include references to acceptable technical data) and adequate sequence for its completion. An IRAN must have a basis and acceptable standards. It is not analogous to an "on condition" inspection. It must have an established level of reliability and life extension (for example, 1,200 in French Air Force IRANs). An IRAN is not a homemade inspection program. Note: In NATO service, repeated T-33 IRANs have resulted in several sections of the aircraft *not* being inspected at all. Therefore, some form of additional inspection process should be used in addition to the IRAN.	
47.	Combining Inspection Intervals Into One	Set time limits for overrun (flex) of inspection intervals.	
48.	Aircraft Storage and Returning the Aircraft to Service After Inactivity	Verify the applicant has a program to address aircraft inactivity and specifies specific maintenance actions for return to service per the applicable T-33 inspection schedule (for example, after 31 days). The aircraft should be housed in a hangar during maintenance. When the aircraft is parked in the open, it must be protected from the elements, that is, full blanking kit and periodic anti-deterioration checks are to be carried out as weather dictates.	
49.	Specialized Tooling for T-33 Maintenance	Verify adequate tooling, jigs, and instrumentation are used for the required periodic inspections and maintenance per the T-33 maintenance manuals. Typical equipment in the T-33 includes appropriate tail cone support and engine lifting fixtures, engine work stands, and aircraft support equipment to maintain the aircraft.	

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50.	Technical Orders Issued While in Service (Engineering Orders in Canadian Armed Forces Service)	Verify the AIP references and addresses the applicable USAF TOs or Canadian Armed Forces Engineering Orders issued to the T-33 during military service to address airworthiness and safety issues, maintenance, modifications, updates to service instructions, and operations of the aircraft (for example, 1T-33A-562, Rework of Lower Front Spar).	
51.	Time Critical Technical Orders (TCTO)	Verify the AIP specifically accounts for, addresses, and documents the applicable TCTOs (or Canadian Armed Forces equivalent) issued to the T-33 while in service. Compliance with the TCTOs is essential for safe operations. If the AIP only makes reference to a few TCTOs issued in 1958, for example, it would not be adequate. Note: TCTOs may have been issued as late as April 2005 with the last operation of a Canadian Armed Forces/RCAF aircraft.	
52.	USAF (or Canadian Armed Forces Equivalent) T-33 Safety Supplements	Verify the applicant/operator has copies of the applicable safety supplements for the T-33 (that is, SF-1-1, SS-1-12) and they are incorporated into the AIP or operational guidance as appropriate. Note: The most current version of the AFM usually provides a listing of affected safety supplements and can be used as a reference.	
53.	Corrosion Due to Age and Inadequate Storage	Evaluate adequacy of corrosion control procedures. Age, condition, and types of materials used in the T-33 may require some form of corrosion inspection control. Ask whether a corrosion control program is in place. If not, ask for steps taken or how it is addressed in the AIP. Recommend the use of TO 1-1-691, Corrosion Prevention and Control Manual.	
54.	J-33, Nene 10, or Nene 106 Engine Maintenance Procedures	Verify the AIP adheres to the USAF/Canadian/Rolls-Royce maintenance procedures requirements. Note: Ex-French Air Force T-33s may have the Hispano-Suiza Nene 106 engine and thus require special documentation.	
55.	Manufacturer's and/or USAF/Canadian Armed Forces Engine Modifications	Verify the AIP addresses the incorporation of the manufacturer's and USAF/Canadian Armed Forces modifications to the J-33/Nene 10 engine installed. The NTSB and some foreign civil aviation authorities have determined a causal factor in some accidents is the failure of some civil operators of former military aircraft to incorporate the manufacturer's recommended modifications to prevent engine failures.	
56.	Cycles and Adjustment Nene 10 Engine Replacement Intervals	Ask if both engine cycles and hours are tracked. With an engine type like the J-33 and the Nene 10 where cycle tracking can be used and, in some cases, was required (by the Canadian Armed Forces and UK Civil Aviation Authority (CAA)) to supplement tracking by hours, this is a safe practice. If the aircraft is a Canadian T-33 with a Nene 10 engine, verify the AIP has the proper adjustment of cycles per hour, as outlined in UK CAA Letter to Owners/Operators No. 288, Rolls-Royce Nene Mk. 10 Engine Life Limits, dated October 11, 2002. Note: Ex-French Air Force T-33s may have the Hispano-Suiza Nene 106 engine and thus require special documentation.	
57.	Nene 10 Engine Special Tools	Verify the applicant/operator has all of the appropriate Wentworth, British standard, and special tools to work on the Nene 10 engine.	
58.	J-33/Nene 10/Hispano-Suiza Nene 106 Engine Inspections and Time Between Overhaul (TBO)	Verify the applicant has established the proper inspection intervals and TBO/replacement interval for the specific engine type (J-33, Nene 10. or Nene 106 and serial number) and adhere to those limitations and replacement intervals for related components, such as flame tubes, throttle valves, fuel burners, starter motors, generators, and low fuel pressure switches. Justification and FAA concurrence is required for an inspection and TBO above those set in the appropriate T-33/engine inspection guidance. Clear data on TBO/time remaining on the engine at time of certification is critical as is documenting those throughout the aircraft life cycle. Note: Nene 10 engines have a TBO of 1965 hours, and the Nene 10 maintenance manual requires mandatory periodic inspections between 270 and 330 hours. The 330-hour inspection encompasses multiple engine components, some of which may require more frequent inspection.	
59.	Engine Thrust	If actual thrust cannot be measured, verify the AIP includes measuring proper engine performance. There is no engine thrust test in the maintenance plan for the Nene 10 engine. Proper engine performance is measured by proper operating tail pipe temperature and indicated revolutions per minute (RPM).	
60.	Use of Different Fuels	Verify the AIP addresses how the use of different fuels may require changes or additions to the J-33, Nene 10, or Nene 106 inspection and maintenance programs. Note: Some operators only use Jet A fuel with Prist and Turbolene (that is, JP8+100) to prevent coking of the fuel nozzles.	

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61.	Turbine Flame Inspection	If possible, recommend the AIP incorporates a method to conduct a turbine flame inspection. Nene 10 engines have had turbine blade failures due to overheating. Note: Although the Nene 10 maintenance manual does not require a flame inspection, an issue exists with improperly installed fuel nozzles that can burn up the stator vanes. The maintenance manual instructions to ensure proper installation of the nozzles is not adequate to determine if they are installed correctly. Some operators instead perform borescope inspections to confirm the nozzles are correctly installed. This is not an issue for properly assembled Nene 10 engines.	
62.	Cracked Engine Casings and Turbine Bucket Failure	Verify the AIP incorporates inspections and repair of cracked engine casings because this is a prior point of failure in both J-33 and Nene engines. Turbine bucket failures have resulted in vibration causing turbine shaft and bearing failures. Note: The RCAF installed a new type of casing in the Nene 10 engines; it may be beneficial to determine if that modification was made to aircraft under review. While engine casings typically do not crack, combustion flame tubes do. If a piece of flame tube were to break away, damage to the stator vane and turbine buckets (turbine blades) would occur. The Nene 10 hot section inspection covers the maximum number and length of cracks repairable for return to service. The Canadian Armed Forces experienced turbine bucket (blade) stretch due to inexperienced flyers over-temping the engine. In that case, the CAF had manufactured new turbine buckets (blades) made of a more modern material to prevent such stretch, and many pilots have since been briefed and/or taught the proper operation of Nene 10 engines, which helps prevents over-temping.	
63.	Inner Cone Support Tubes	Verify the AIP provides for the proper condition and inspection of the inner cone support tubes. The blow-by from the tubes may not be in an acceptable condition, as it could generate an over-heat condition in the aft section. Note: One T-33 operator conducts 300-hour inspections at no later than 330 hours, as outlined in its maintenance plan, which helps prevent this issue.	
64.	Engine Ground Run	After engine reassembly, check to verify the engine goes through a ground run and check for leaks. Confirm it achieves the required RPM for a given exhaust gas temperature (EGT), outside air temperature, and field elevation. Note: A large T-33 operator runs its engines after reassembly in its test cell airplane before installation in an active aircraft or being put in ready storage.	
65.	Fire Detection System	Verify the serviceability of the fire detection system, that is, red fire warning and amber tail pipe light. Fire warning system malfunctions and false indications are common with the T-33. Note: The Nene 10 engine installation on Canadian T-33s generated greater heat in the aft fuselage section than on J-33 equipped USAF T-33s.	
66.	Plenum Chamber Piano Hinge Failure	Verify the AIP incorporates inspection of this item. For some T-33 operators, this is a normal part of the yearly condition inspection and is checked on each preflight by both the ground and flight crew.	
67.	Improper Installation of Interconnector Clamp Between Combustion Chambers	Verify the AIP incorporates inspection of the installation of the clamping ring on interconnectors between combustion chambers in the Nene 10 engine. The Canadian Armed Forces (Nene 10 engine) EO 10B-15B-02 covers this. Applicability to the Nene 106 should be verified.	
68.	Servicing, Engine Fire Servicing Personnel Unfamiliar With the T-33 Create Hazardous Situations	Verify the operator warns servicing personnel via training and markings of the fire hazard of overfilling oil, hydraulic, and fuel tanks. Lack of experience with T-33 servicing is a safety concern. Require supervision of servicing operations and fire safety procedures. One well-known T-33 operator maintains trained fire crew on site, requires fire control and evacuation training for all technicians working on the flight line, and ensures T-33 mechanics have been trained in the proper servicing of the aircraft. The operator also ensures that in offsite operations, a pilot supervises line personnel who would service the aircraft during transit operations, and that on longer deployment, maintenance staff travel with the aircraft to perform these duties.	
69.	Fire Guard	Verify maintenance, servicing, preflight and postflight activities include fire guard precautions.	
70.	Engine Start	Verify the AIP includes procedures for documenting all unsuccessful starts. Failure to take into account engine start deficiencies (including not following the applicable TOs) has caused manyT-33 engine failures.	
71.	Tail/Engine Separation	Verify adequate tail/engine separation by using proper support equipment to prevent structural and serious engine damage.	

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72.	Engine Storage	Review J-33, Nene 10, or Nene 106 engine storage methods and determine engine condition after storage. Evaluate calendar time since overhaul. For example, the use of an engine with 50 hours since a 1991 overhaul may not be adequate and a new overhaul may be required after a specified time in storage. Note: The FAA's position on experimental exhibition of former military aircraft is that engines that have exceeded storage life limits are susceptible to internal corrosion, deterioration of seals and coatings, and breakdown of engine preservation lubricants. A T-33 operator notes that it runs its engines after re-assembly in a spare airframe as a test bed before installation in an active aircraft or being put in ready storage and performs a condition inspection of that engine before operation.	
73.	Engine Foreign Object Damage (FOD)	Verify adoption of an FOD prevention program (internal engine section, external, and air intake). Use air intake covers designed for the T-33. Some T-33 operators use external canvas covers for stored engines as well as inlet covers for parked aircraft, and FOD control is an ongoing process. Some operators annually train personnel in FOD control processes before they are allowed access to the ramp.	
74.	Engine Condition Monitoring (SOAP)	As part of the engine maintenance schedule, recommend an engine Spectrographic Oil Analysis Program (SOAP) be implemented with intervals of less than 5 hours. If baseline data exists, this can be very useful for failure prevention. If manufacturer baseline data does not exist, this may still warn of impending failure. On the issue of engine condition monitoring, one T-33 operator ensures every postflight has a maintenance plan item to perform a chip plug check for contaminates. Note: Spectrometric Oil Analysis (SOAP) - In the SOAP program samples of used oil containing microscopic metal particles are sent periodically to an oil analysis laboratory. There the oil and its metal particles are burned by an electric or gas flame. The wave length of the light emitted from the burning oil and metal particles is measured to determine the kind and quality of metal in the oil. The identification gives advance warning of excessive wear on particular engine parts, thereby aiding in preventing in-flight engine failures.	
75.	Fuel Tank Leaks and Fuel Cap/Seal (and Related Lines) Failures	Inspect (especially for leaks) and replace components of the bladder-type T-33 fuel tanks as necessary (for example, every 8-10 years) or as required by the manufacturer. The age of the aircraft dictates this practice. Emphasize the proper inspection, replacement, and operation of all fuel caps, seals, and related lines. Fuel leaks into the engine section, accessories section, and alcohol tank have caused numerous incidents and accidents in T-33 operational use. If the tanks demonstrate leaks, they should be removed and sent out for repair. The source of fuel entry into the engine compartment was from the early USAF T-33 aircraft that had a fuel cap on the center tank behind the canopy. This was eliminated on later T-33s and was never installed on Canadair CT-133 aircraft. One operator notes that all of its fuel cap adapters and seals have been reconditioned (steel parts have been removed, striped, and cadmium plated) and resealed in the last 2 years. Note: There are indications that some early T-33s may have had fiberglass fuel tanks.	
76.	Broken Systems (Fuel, Oil, and Hydraulic) Lines	Verify the AIP includes procedures for inspecting and replacing fuel, oil, and hydraulic lines according to the applicable USAF or Canadian Armed Forces requirements; for example, MIL-DTL-8794 and MIL-DTL-8795 specifications. Line defects have been documented within 50 months of service and have been linked to engine fires.	
77.	Nene 10 Fuel Pipes	If applicable to the installed engine (that is, a Nene 10 Mk.103), verify the AIP addresses the fuel pipe inspections as provide by the Rolls-Royce notice Replacement of Rolls-Royce Nene Mk.103 Engine Elastomeric Fuel Pipes, dated May 1, 2012. This document notes: "provided that the fuel pipes … are thoroughly inspected every 2 years and continue to meet the inspection and test criterion, Rolls-Royce considers that they could be considered serviceable and remain in service." Note: When referring to "fuel pipes" in the British lexicon, reference is being made to flexible hoses.	
78.	Fuel Float Switches	Verify the AIP includes procedures to determine if the fuel float switches fully close. Note: One T-33 operator has performed this operational check during maintenance on numerous occasions, and argues it should not be elevated for special inclusion in the ,maintenance plan/AIP.	
79.	Fuel Vent Indicator Light	Determine if the aircraft has a fuel vent indicator light installed. This is important in mitigating the potential for fuel venting due to faulty fuel float switches. Note: Some CT-133 aircraft have no fuel vent indicator light.	

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80.	Fuel Pump and Hydraulic System Problems	Verify the AIP provides for the correct inspection procedures for the fuel pump installed in the aircraft, especially if the pump is a double-headed fuel pump, commonly found in Canadian T-33s. Fuel pump shaft shearing and leaks are a known issue. Also, mishandling during fuel pump maintenance and fatigue cracking of pump components has caused fatalities and destroyed aircraft. Adhere to manufacturer's inspection guidelines and replacement times. The T-33 hydraulic system (3,000 psi), as with many aircraft of its generation, is prone to failure. The system should be completely flushed when the hydraulic pump is replaced. Both normal and emergency hydraulic systems in the T-33 are important safety items. Common failures include broken lines, hydraulic accumulator bladder leaks, low accumulator pressure, hydraulic fluid contamination, and over-torque of fittings. Consider expanding upon the USAF/Canadian Armed Forces inspection guidelines for the hydraulic system(s) by adopting more frequent inspection and replacement times. This can be emphasized in the AIP.	
81.	Systems Functionality and Leak Checks	Verify procedures are in place to check all major T-33 systems in the aircraft for serviceability and functionality. Verify the leak checks of all systems are properly accounted for in the AIP per the USAF/Canadian Armed Forces requirements.	
82.	Oil, Fuel, and Hydraulic Fluids	Verify procedures are in place to identify and use a list of equivalents of materials for replacing oil, fuel, and hydraulic fluids. A good practice by many operators is to include a cross-reference chart for NATO and U.S. lubricants as part of the AIP.	
83.	Electrical System and Batteries	Verify functionality of the generator and the compatibility of the aircraft's electrical system with any new battery installation or other system and component installation or modification. Avoiding overload conditions is essential because this is a known problem with the aircraft's electrical system. In some T-33s equipped with a Tactical Air Navigation (TACAN) unit, the original 300A system may have been replaced/upgraded to a 400A system. Moreover, in operational service, T-33 electric cables and bundles have regularly (that is, within 5-7 years) been found to be defective and thus their inspection at regular intervals is essential. Note: T-33 accidents have occurred due to improper installations causing fatigue failure of the voltage regulator lead wire, allowing a runaway generator condition. Generator failures are common. The electrical system in the CT-133 aircraft is a 500 AMP continuous duty system, and the electrical wires and bundles are not known to be prone to failure and should be annually inspected "on condition."	
84.	Nose Armament Doors	Require the latch mechanism be specifically included in the AIP. One T-33 operator regularly inspects its CT-133 nose armament door latches and incorporates a special security lock to prevent their being tampered with after preflight. The nose armament doors latches are 109 X and are replaced during yearly inspection with unused old stock parts provided from surplus parts inventory.	
85.	Auxiliary ("Sucker") Doors	Verify the AIP provides for the correct inspection procedures for the upper fuselage auxiliary doors. Note: In the T-33, not enough air came through the intake during takeoff run to generate the thrust necessary for the jet to become airborne. As a result, the T-33 has what were known as "sucker" doors on the upper fuselage.	
86.	Borescope Engine	Recommend the AIP incorporate borescope inspections of the engine at 50 hours per the applicable inspection procedures. AC 43.13-1 can be used as a reference. Note: Although there is no requirement in the Nene 10 maintenance manual for borescope inspections, some operators perform internal borescope inspections during flame tube installation to ensure proper alignment of components.	
87.	Defroster System	Verify procedures are in place to service the defroster system per the inspection and maintenance manual. Defroster malfunction was the cause of several T-33 accidents. Note: If pilots of Canadian Armed Forces CT-133s placed items on the glare shield, it could cause issues with the electrical defrosting system (which, as a practice, the Canadian Armed Forces did not use). In one operator's case, it has removed the electrical defrosting system and it is no longer a factor. The operator also replaced the faceted windshield glass on the CT-133 aircraft with a one-piece windshield manufactured by Advanced Aerospace Design and Development, Inc.	
88.	Pitot/Static, Lighting, and Avionics and Instruments	Verify compliance with all applicable 14 CFR requirements (that is, § 91.411) concerning the pitot/static system, exterior lighting (that is, adequate position and anti-collision lighting), transponder, avionics, and related instruments.	

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89.	Oxygen System	Emphasize the inspection of the oxygen system and any modifications. Compliance with § 91.211, Supplemental Oxygen, is required. Recommend adherence to 14 CFR § 23.1441, Oxygen Equipment and Supply. Verify safe servicing operations—oxygen-induced explosions were not uncommon in T-33 operations and have caused fatalities and destruction of aircraft. In operational service, T-33 oxygen systems have malfunctioned, notably due to leaking. Note: The oxygen system in Canadian aircraft was vastly different than the system installed in standard USAF T-33s, that is, addition bottles. Moreover, per FAA Order 8900.1, change 124, chapter 57, Maintenance Requirements for High-Pressure Cylinders Installed in U.S.-Registered Aircraft Certificated in Any Category, each high-pressure cylinder installed in a U.S.-registered aircraft must be a cylinder manufactured and approved under the requirements of 49 CFR, or under a special permit issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA) under 49 CFR part 107. There is no provision for the FAA to authorize "on condition" for testing, maintenance, or inspection of high-pressure cylinders under 49 CFR (PHMSA). Note: The difference between the T-33 and CT-133 was only the two additional bottles and associated plumbing. Operators should maintain these systems through regular hydrostatic tests as required by the nature of the bottle material as installed, and retire out-of-service components as they expire per the maintenance manual instructions. One operator is currently modifying one of its aircraft to incorporate a four-bottle high pressure system. That operator state that the A-14 diluter demand Oxygen regulators is on life-limit and it tracks time in service and regularly overhauls and replaces it as service life dictates.Hours are tracked on the aircraft dispatch sheet.	
90.	Other High-Pressure Cylinders	Emphasize the proper inspection of any other high-pressure cylinders installed in the aircraft, that is, fire bottles and nitrogen gas (N2). As per FAA Order 8900.1, change 124, chapter 57, each high-pressure cylinder installed in a U.S.-registered aircraft must be a cylinder manufactured and approved under the requirements of 49 CFR, or under a special permit issued by the PHMSA under 49 CFR part 107. There is no provision for the FAA to authorize "on condition" for testing, maintenance, or inspection of high-pressure cylinders under 49 CFR (PHMSA). For example, the fire bottles are time-sensitive items, and may have a limit of 5 years for hydrostatic testing. The issue is when the bottles are removed from the aircraft. It is industry knowledge that non-U.S. bottles may be installed as long as they are within their hydrostatic test dates. A problem arises when removing the bottles for hydrostatic testing. Maintenance programs require these bottles to be hydrostatic tested. Once the non-U.S. bottles are removed from the aircraft, they are not supposed to be hydrostatic tested, recharged, or reinstalled in any aircraft. Moreover, those bottles cannot be serviced (on board) after the testing date has expired.	
91.	Anti-G Suit System	If installed, verify its serviceability. T-33 accidents have been linked to the lack of a functional anti-G suit system. Note: This is related to any operation above 3.5 G. One T-33 operator's pilots rarely exceed 3.5 G in the operation of its T-33s.	
92.	Cockpit Instrumentation Markings	Verify all cockpit markings are legible and use proper English terminology.	
93.	Pressurization Vessel	Verify the AIP incorporates the inspection of the pressurized sections of the aircraft (cockpit), noting pressure-cycles, and any repairs in the area. Note: Some Canadian T-33 aircraft had operational limitations imposed such as limiting operational altitudes. A T-33 operator explains that cycles are not counted and that repairs are conducted per the structural repair manual. The operator also states that operating altitudes are set by crew, and that the critical areas are inspected during annual inspections. Note: Some T-33s (AUP CT-133s) were completely rebuilt in the cabin area and better sealing was incorporated to provide better pressurization. However, it is well known that the airplanes still did not hold good pressurization.	
94.	Safety Markings and Stenciling	Verify appropriate safety markings required by T-33 technical manuals (that is, stenciling and "Remove Before Flight" banners) have been applied and are in English. These markings provide appropriate warnings/instruction regarding areas of the aircraft that could be dangerous. These areas include intakes, exhaust, air brakes, and ejection seats. In the case of ejection seat systems, and as noted in FAA Order 8130.2, paragraph 4074(e), "a special airworthiness certificate will not be issued before meeting this requirement." Note: One T-33 operator uses a fly away kit for offsite operations.	
95.	Incorrect Hardware	Verify the AIP incorporates the use of the correct hardware, for example, bolts. This is an issue that was addressed by the Canadian Armed Forces in its T-33 operations because it caused several incidents. This must be emphasized in all civil operations because (1) original hardware may be difficult to acquire and (2) some aircraft may incorporate the non-approved items today.	

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96.	Elevator Installation on Some Canadian T-33s	Determine if the aircraft is a former RCAF aircraft that required a unique elevator installation to the horizontal stabilizer. If it is, appropriate guidance must be available. An RCAF aircraft record for such an aircraft notes: "ELEVATOR INSTALLATION IS UNIQUE TO H-STAB S/N 639 ON THIS A/C DUE TO POSITION OF H-STAB HINGE FIXTURES. REPLACEMENT OF L/H ELEVATOR ON THIS A/C WILL REQUIRE NDHQ/DAEPM ADVICE IF H-STAB/ELEVATOR HINGE MISMATCH IS EVIDENT."	
97.	Aileron Booster	Verify the AIP addresses the inspection and maintenance of this component. Lateral control is affected by ailerons connected via torque tubes and control cables augmented by a hydraulic booster. This booster is essential for aircraft control at high speed. There have been failues due to over-torqueing fittings. Also, verify the correct settings (1 to 8 degrees) are properly selected.	
98.	Cockpit FOD	To preclude inadvertent ejection, flight control interference, pressurization valves clogging, and other problems, verify the AIP addresses thorough inspection and cleaning of the cockpit area. This is a standard USAF/U.S. Navy practice.	
99.	Main Landing Gear and Nose Wheel	Emphasize a detailed inspection of the main landing gear and nose wheel system (including shimmy damper and correct O rings) and adhere to USAF/U.S. Navy/Canadian Armed Forces inspection guidelines and maintenance requirements (that is, retraction tests) and operation requirements (that is, safety pins). Wrong bearings have also led to main wheel failures. Some Canadian T-33s had a modified spring-loaded cylinder for the nose landing gear down-lock that includes specific operational, inspection, and repair requirements.	
100.	Tires and Wheels	Verify use of proper tires and/or equivalent substitutes (including inner tubes) and adherence to any tire limitation, such as allowed number of landings, inflation requirements, and the use of retreaded tires. The type of tire (that is, 12 ply) may dictate the number of landings. Wheels must be properly and regularly inspected and balanced. Note: Because of the aircraft version and origin, there are several types of T-33 wheels and thus appropriate data is required. One T-33 operator reports it replaces the tires long before the allowable limits outlined in the maintenance manual would require their replacement.	
101.	T-33 Inner Door Actuators (Mains)	Verify the AIP addresses the correct type and proper inspection of the inner gear door and inner gear door actuator bolts.	
102.	Explosives and Propellants	In addition to verifying manufacturer and service (USAF/Canadian Armed Forces) requirements are followed, check compliance with applicable Federal, State, and local requirements for explosives and propellants in terms of use, storage, and disposal. One T-33 operator maintains an SOP manual for handling of all explosives and propellants that requires proper handling, storage, and disposal, as well as personnel training for anyone involved in the maintenance of ejection seat systems. The operator uses the USAF CAD/PAD and Canadian Armed Forces procedures in the maintenance, replacement, and life limit determination of all ejection seat ordnance.	
103.	In-Flight Canopy Separation	The AIP should address the proper maintenance of transparencies and canopy locks. Monitoring and inspection of the canopy for crazing should be conducted every 10 hours of flight. Canopy failures, delaminations, and Plexiglas deterioration are common with older transparencies. Procedures should address this in the AIP and as part of postflight procedures.	
104.	Canopy Seals	Test canopy seals for leaks (that is, use ground test connection).	
105.	Emergency Canopy Jettison Mechanism	Verify the AIP includes testing the emergency canopy jettison mechanism. It must be functional and properly inspected per the applicable technical guidance. Note: The original canopy actuators were a major problem, and it was found that pilots could neither release nor jettison the canopy in an emergency situation.	
106.	Brake System	Emphasize a detailed inspection of the brake assemblies, adhere to manufacturer's inspection guidelines and replacement times, and consider more conservative inspections. Recommend brake inspection at 20 to 30 landings. Note: One T-33 operator reports that its maintenance personnel perform brake inspections at every preflight and postflight.	

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107.	External Drop and Tip Tanks	Verify the type, condition, installation, and removal of drop tanks meet requirements of the manufacturer or military operator. Only drop tanks cleared for use by the aircraft manufacturer, USAF, or Canadian Armed Forces (that is, 230-gallon ST-25-230-4800 tanks) may be used on the aircraft. Canadian Armed Forces maintenance requirements for the T-33 tip tanks are found in CFTO C-12-133-ODO/MF-001, Tip Tanks Maintenance. The only modification allowed to the drop tanks is to prevent jettisoning. From the FAA perspective, the danger to people and property must be mitigated as well. This is not an imaginary risk. For example, on October 14th, 1959, an USAF T-33 began having engine problems. In an effort to make it back to Wright-Patterson AFB, the pilot tried to jettison the wing-tip fuel tanks to lighten the aircraft. One of the fuel tanks, weighing some 1400 pounds with fuel, happened to fall on the Lanning residence. The tank went through several walls and killed the family dog…" http://www.libraries.wright.edu/special/ddn_archive/2012/12/11/wright-patterson-afb/.As a result, active jettison systems may have to be mitigated by restricting flight over populated areas. Accidental jettisoning of the tanks is a known T-33 safety hazard. Any means of releasing the tanks during aircraft operation must be disabled. In RCAF service, there have been many instances of difficulty feeding fuel from tip tanks and tip tank modifications, and special inspections were issued.	
108.	Hoses and Cables	Inspect and replace hoses and cables appropriately. This is a critical flight safety item with the T-33 due to materials quality and age.	
109.	Wing Stall Strip	Verify whether the wing leading edge stall strip is installed and undamaged. This modification was made to improve the aircraft's stall and spin characteristics.	
110.	Grounding	Verify adequate procedures are in place for grounding the aircraft.	
111.	Antennas	Verify any original antennas are compatible with all installed electronics.	
112.	Transparencies Problems	Proper transparencies maintenance is required for safe operations. Monitor/inspect canopy for crazing every 10 hours of flight. Note: One T-33 operator has had new transparencies manufactured and installed by the original canopy manufacturer, has only life-limited canopies and conducts an annual prism inspection to detect cracks or crazing that would cause rejection of the canopy.	
113.	Hard Landings and Over G Situations	Verify hard landing and over-G inspection programs are adopted. This is especially important when acrobatics are performed or when the aircraft is involved in military support missions outside the scope of its experimental certificate (that is, public aircraft operations).	
114.	Parts Fabrication	Verify engineering (that is, Designated Engineering Representative (DER)) data supports any part fabrication by maintenance personnel. This is an issue because it is a common practice in T-33 restorations. Unfortunately, many of these modifications have been made without adequate technical and validation data. AC 43-18, Fabrication of Aircraft Parts by Maintenance Personnel, may be used for guidance.	
115.	Wing and Tail Bolts and Bushings	Ask about inspections and magnafluxing of these items. Recommend the AIP incorporate other commonly used and industry-accepted practices involving non-destructive inspection (NDI) if not addressed in the manufacturer's maintenance and inspection procedures.	
116.	Wing Spar Failure and Inspection and Wing Attach Point Cracks	Verify the AIP includes a detailed and thorough inspection of the wings (especially the spars and wing attach point) per the applicable USAF/Canadian Armed Forces requirements (that is, TOs or EOs), including those addressing changes, fixes, and other operational issues. For example, TO 1T-33A-562, Rework of Lower Front Spar, requires the installation of a spar cap. Spar cracks have been noted in aircraft disposed by the Canadian Armed Forces and in-flight break ups were traced to spar failure. Cracks in the wing attach points were also found in the United States by Lockheed in 1958 and in French AF T-33s in the 1960s. The maintenance cycle should include an yearly internal inspection of the wing and fin assemblies accessible by borescope. The inaccessible areas of the wing and spar should be inspected over the 3-year maintenance cycle in accordance with Technique T-33/XRAY/1. Note: One T-33 operator performs a visual internal and external inspection of the wing spar each year at the conditional inspection. TO 1T-33A-562 pertains to USAF T-33 aircraft only. X-ray inspections should be carried out per book 1, paragraph 49 of CFTO C-12-133-000/MN-000, CT-133 Structural Repair Maintenance Manual, detailing the use of X-Ray inspection.	
117.	Horizontal Stabilizer Inspection	Verify the AIP includes this inspection. For Canadian T-33s, the applicable guidance is Inspection Reference 624222, dated November 18, 1993. For example, an entry in the CF 339 (form for Canadian aircraft) would address the horizontal stabilizer inspection as "CAT '0' NDT T.B.C.O. ON #3 PER INSP. REF: 624222 18 NOV 93 TECHNIQUE 133-139 X REV A TO BE CARRIED OUT EVERY PERIODIC."	

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118.	Flight Control Balancing and Deflection	Verify flight controls were balanced per the maintenance manual(s) after materials replacement, repairs, and painting. Verify proper rigging and deflection. In several former military aircraft, damage to flight controls has been noticed when inadequate repairs have been performed. If there are no adequate records of the balancing of the flight controls, the airworthiness certificate should not be issued. Note: On the T-33, related issues include evidence of over-travel of ailerons, pre-existing fatigue cracks, and evidence of aileron flutter.	
119.	Aileron Deformation and Failure	Because air loads can result in aileron deformation and structural failure, carefully inspect the aileron before and after each flight and adequately address it in the AIP.	
120.	Air Brakes	Verify proper condition, deflection, and warning signage. The air brakes are a normal preflight, postflight, and conditional inspection item.	
121.	Accurate Weight and Balance (W&B)	Review original W&B paperwork. Verify adherence to USAF or Canadian Armed Forces guidance (that is, Lockheed T-33A-1, 5, 10, 15 USAF 1959 Basic Weight Checklist and Loading Data, and RCAF EO-05-50C-8), as well as FAA-H-8083-1, Aircraft Weight and Balance Handbook, if documentation by the applicant appears to be inadequate. T-33 accidents (including civilian) have been linked to extreme aft center of gravity due to the lack of a rear seat passenger and baggage and equipment in the nose compartment.	
122.	Wing Flaps	Inspect and repair wing flaps per the aircraft's maintenance instructions.	
123.	MOD CF 751 Windscreen (Maintenance)	Ensure the only cleaner used on the one-piece windscreen installed in many Canadian T-33/CT-133s per MOD CF 751 is the authorized cleaner and/or polish substances and associated cloths.	
124.	Strain Gauges	If strain gauges are installed in a particular T-33 per OLM MOD C-12-133-000/CD-049, recommend they be serviceable. If they are not serviceable, issue the appropriate group 6 limitations from FAA Order 8130.2. Note: When installed in some T-33, these G-meters were not resettable by the pilot so that the crew chief could tell at post-flight that aircraft had been flown under to limit the capability, overstressing the airplane and then not letting the crew chief know that it had occurred.	
125.	T-33 (AUP) Upgrade and the HBU-12/B Lap Belt	Verify proper inspection procedures and inspection intervals. The failure of this part may be related to fatal accidents in Canada. Contact the Classic Jet Aircraft Association (CJAA) for additional information.	
126.	"Experimental" Markings	Verify the word "EXPERIMENTAL" is located immediately next to the canopy railing, on both sides, as required by § 45.23(b). No subdued markings.	
127.	N-Number	Verify that the marking required by 14 CFR part §§45.25 and 45.29(b) concerning registration number (N-number), its location and size are complied with. If non-standard markings are proposed, verify compliance with Exemption 5019, as amended.	
128.	Type of Ejection Seat System	Identify the type of ejection seat fitted to the aircraft. Early T-33s did not have an ejection seat, while later models incorporated complex designs. The Lockheed C-1 seat was common. The type of seat changes many aspects of operations and maintenance. Note: Of the three CT-133 aircraft one T-33 operator operates, all three ejection seats are of the same design except for the arm rest ejection handles, of which all three types known to exist are represented. These differences are listed the pilot training manuals and CT-133 differences guide the operator has produced for the operation of these aircraft.	

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129.	Ejection Seat System Maintenance	Ensure maintenance and inspection of ejection seat and other survival equipment is performed in accordance with the USAF/Canadian Armed Forces procedures or U.S./NATO applicable TOs by trained personnel. Include specific inspections and recordkeeping for pyrotechnic devices.. Ejection seat system replacement times must be adhered to. No "on condition" maintenance may be permitted for rocket moors and propellants. Make the distinction between replacement times, that is, "shelf life" vs. "installed life limit." For example, a 9-year replacement requirement is not analogous to a 2-year installed limit. If such maintenance documentations and requirements are not available, the seat must be deactivated. Note: Self life is the total period of time (beginning with the date of manufacture/cure/assembly) that an item may remain in the combined wholesale (including manufacture) and retail storage system and still remain suitable for issue to and use by the end user. Shelf life is not to be confused with service life, which is a measurement of anticipated total in-use time.	
130.	Ejection Seat System Maintainers Training	Require adequate ejection seat training for maintenance crews. Several ejection seat types were fitted to the T-33. On May 9, 2012, an improperly trained mechanic accidentally jettisoned the canopy of a T-33 while performing maintenance, seriously injuring himself. Note: One operator administers specific tests and five different courses to handlers for the ejection seat CAD/PADs (initiators), and maintains specific storage disposal and tracking requirements for each initiator type of explosive. The operator also does not allow maintenance personnel access to the aircraft without first receiving training regarding the ejection seats and the hazards associated with working around them.	
131.	Ejection Seat Modifications	Prohibit ejection seat modifications unless directly made by the manufacturer or properly documented. Note: Without modification, a CT-133 ejection seat could not be maintained in an operational status as several CAD/PADs (initiators) are no longer procurable. One operator has contracted with engineering firms that design ejection seat systems to provide similar and procurable ordnance to maintain the ejection seats. This engineering documentation is maintained as proprietary information in the operator's aircraft document library. The seats are further modified by a Ridged Arm Drogue System developed for the Canadian Armed Forces to provide improved man/seat separation upon ejection."	
132.	Cracks in the Ejection Seat Rails	Inspect the ejection seat rails for cracks. Note: In 1983, the Canadian Armed Forces grounded the T-33 fleet for inspections of these items after cracks were found in several of the aircraft.	
133.	Air Intake and Duct	Verify the AIP incorporates the inspections of the air intake, spilt plate, and duct, per the applicable USAF or Canadian Armed Forces guidance.	
134.	Fuel Vents and Drains	Verify the AIP incorporates inspection of all fuel vents and drains (Sabre drains). This is also an important issue during preflight and servicing to prevent fires. In addition, in T-33 servicing personnel unfamiliar with the aircraft have plugged drains and thus created a serious hazard.	
135.	Cracks in Upper Wing Skin at LH and RH Main Landing Gear Oleo Service Panels	Verify the AIP incorporates inspection of this area. This concern has been documented by the RCAF and found in T-33s intended for sale for civilian use. A T-33 operator notes that some of its aircraft have the repair doublers installed by the RCAF in these access areas. These were installed to address this concern.	
136.	Ground Support Equipment Maintenance	Verify the AIP provides for the proper maintenance of all required ground support equipment.	

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T-33 Operating Limitations			
137.	AIP and Related Documentation	As part of the operating limitations, require adherence to the AIP and related documentation. In fact, a prominent T-33 operator's current operating policies require this.	
138.	Understanding of the Operating Limitations	Require the applicant to sign the Acknowledgment of Special Operating Limitations form.	
139.	T-33 Pilot in Command (PIC) Requirements	Ensure that in addition to holding the required experimental authorization, airplane category, and single-engine class ratings. As a matter of policy, the FAA requires a pilot have a total of 1,000 hours before they can be issued an authorization to act as PIC of an experimental jet unless they were trained by the U.S. military as a jet pilot. Refer to the appropriate pilot authorization policy. Recommend a minimum of 10 hours of dual training in the T-33 of the same type to be flown for previous US military jet pilots. This recommended minimum should be adjusted upward for non-former military pilots based on the pilots flight experience. Recommend proficiency and currency of 3 hours per month and five takeoffs and landings. Note: The USAF restricted to two the number of aircraft types a pilot could hold currency on. Note: In operational use, transition to the T-33 in the USAF and other NATO countries varied from 20 to 60 hours depending on the previous experience of the pilot (that is, initial jet course) and "pipeline" (that is fighters v. bombers).	
140.	Flight Manuals	Ensure the PIC operates the aircraft as specified in the flight manual (Canadian Forces manual and USAF-1) for the T-33 version being flown. Note: A USAF manual is not suitable for operations of a Canadian T-33. One CT-133 operator's pilots use chapter 3 of the CFTO C-12-133-000/MB-000 flight manual with supplements for added equipment.	
141.	Flight Servicing Certificate	Recommend a Flight Servicing Certificate or similar document be used by the ground crew to attest to the aircraft's condition (that is, critical components such as tires) before each flight to include the status of all servicing (that is, liquid levels, fuel levels, hydraulic fluid, and oxygen).	
142.	Adequate Annual Program Letter	Verify the applicant's annual program letter contains sufficient detail and is consistent with the applicable regulations and policies. (Many applicants/operators submit inadequate and vague program letters and fail to submit them on an annual basis.) Also verify the proposed activities (for example, an air show at a particular airport) are consistent with the applicable operating limitations (that is, avoiding populated areas) and do not pose a safety hazard, such as the runway being too short. Refer to http://www.warbirds-eaa.org/forms/. Note: One T-33 operator reports it applies for annual program letters in a timely manner, ensures the letters accurately reflect anticipated activity, and coordinates any planned activity not on the current program letter with the Flight Standards District Office before conducting a flight involving the subject activity.	
143.	T-33 Flight Manual Warnings, Cautions, and Notes	Consider requiring review (before flight) of all T-33 flight manual warnings, cautions, and notes.	
144.	Canadian Aircraft Particularities and Restrictions	If the aircraft is an ex-RCAF T-33, verify whether it includes aircraft-specific restrictions in the form of "flight permit" and/or "difference data sheet" restrictions. The operator must understand those restrictions before flight, especially any post-restoration flight. One Canadian T-33 operator notes that its aircraft operate per the published flight manual's Part 6 difference data sheets.	
145.	Maintenance and Line Support	Verify the aircraft is operated with qualified crew chief/plane captains especially during preflight and post-flight inspections as well as assisting the PIC during startup and shutdown procedures. Preveious Air Force or U.S. Navy experience recommended. Note: A crew chief (USAF) or airplane captain (U.S. Navy) is the person (a noncommissioned officer) who is in charge of the day-to-day operations, maintenance, and ground handling of an aircraft.	

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146.	Ejection Seat System PIC Training	Require adequate ejection seat training for the PIC and crew, if applicable, for the type of seat installed. Several ejection seat types were fitted to the T-33. Not all ejection seats are the same. Note height limitation for the ejection seat. Note: The record shows the safety record of attempted ejections in civilian former military aircraft is very poor, typically indicating poor training leading to ejections outside of the envelope. The ejection envelope is a set of defined physical parameters which may allow a successful ejection. It is primarily an interaction of two independent sets of parameters: the physically designed characteristics of the particular ejection system and the dynamics of the aircraft flight profile at the moment of ejection. One T-33 operator's pilots are selected on the basis of having previous ejection seat training in the military. Its initial CT-133 training involves discussions on ejection seat capabilities and procedures, and additional crew receive documented ejection seat training before flight.	
147.	Ejection Seat System Ground Safety	Verify the safety of ejection seats on the ground. Verify ejection seats cannot be accidentally fired, including prohibitions of untrained personnel from sitting on the seats. In fact, one T-33 operator's SOPs and checklists incorporate steps to ensure proper ejection seat pin protocol is followed.	
148.	Ejection Seat System Safety Pins	Require the PIC to carry the aircraft's escape systems safety pins on all flights and high-speed taxi tests. SOPs should be in place to ensure ejection seat safety pins are always available for installation by the PIC, crew, or ground personnel when appropriate.	
149.	Parachutes	Comply with § 91.307, Parachutes and Parachuting. This regulation includes parachute requirements (1) that the parachute be of an approved type and packed by a certificated and appropriately rated parachute rigger, and (2) if of a military type, that the parachute be identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designation or specification number. The parachute must also be rated for the particular ejection seat being used. One T-33 operator ensures the parachutes used in its T-33s are packed by licensed parachute riggers.	
150.	Engine Operating Limits and Spool Time	Adhere to all engine limitations in the applicable USAF/Canadian Armed Forces flight manuals. In Canadian service, several T-33s had an operational restriction imposed on the EGT alert audio warning system. Note: T-33 engine spool times (J-33, Nene 10, and Nene 106) varied from 12 to 20 seconds, which is slow compared to modern jet engines.	
151.	Engine Operating Limits and Jet Assisted Takeoff (JATO) Rockets	Prohibit the use of JATO rockets.	
152.	External Stores	Prohibit the installation of external stores to the wing that were not approved by the manufacturer or the military operator. Examples include ECM and travel pods. No external stores may have an in-flight release mechanism.	
153.	Restrict Acrobatics	Restrict acrobatics per the appropriate USAF flight manual. Many T-33 accidents have been related to low-altitude acrobatics. If considered, any maneuvers must be completed above 5,000' AGL 15,000 ft. Consider prohibiting the following maneuvers: • Intentional spinning, stalls below 15,000' AGL ft, and vertical stalls; • Sideslips using full rudder; • Inverted flying for more than 10 seconds; • Any maneuvers involving large yaw angles at all speeds; • Violent rolling pullouts or snap rolls at all speeds; • All uncoordinated turns or steep spirals; and • Roll rate greater than 45 degrees/second when tip tanks are full. Note: One T-33 operator's checkout program involves familiarization to standard acrobatic maneuvers. Per Boeing policy, flight manual limitations and recommendations must be observed and the operator does not permit pilots to conduct any demonstration or intentional low altitude acrobatic maneuvers.	
154.	Mach Meter and Airspeed Calibration	Require the installation and calibration of a Mach meter or verify the PIC makes the proper Mach determination before flight. Unless the airspeed indicator(s) is properly calibrated, transonic range operations may have to be restricted. One T-33 operator's aircraft are equipped with a combination Mach/airspeed indicator that covers the full speed range.	

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155.	Accelerometer	Ensure the aircraft's accelerometer is functional. This instrument is critical to remain within the required G limitation of the aircraft.	
156.	High-Speed Controllability	Recommend limiting transonic operations to Mach 0.75. This provides a good safety margin and could be addressed in the operating limitations, the AFM, and related SOPs. One T-33 operator reports it has no current operational requirement to operate faster than Mach 0.75 in the CT-133.	
157.	Phase I Flight Testing	The aircraft needs detailed Phase I flight testing for a minimum of 10 hours. Recommend, at a minimum, all flight tests and flight test protocol(s) follow the intent and scope of acceptable USAF functionality test procedures (refer to TO 1-1-300, Maintenance Operational Checks and Flight Checks). Returning a high-performance aircraft such as the T-33 to flight status after restoration cannot be accomplished by a few hours of "flying around." Safe operations also require a demonstrated level of reliability.	
158.	Post-Maintenance Check Flights	Recommend post-maintenance flight checks be incorporated in the maintenance and operation of the aircraft and that TO 1-1-300, Maintenance Operational Checks and Flight Checks, June 15, 2012, be used as a reference.	
159.	Flight Over Populated Areas	Prohibit flights over populated areas, including take-offs and landings, if the ejection seat is functional. If not, the aircraft may be operated over populated areas for the purpose of takeoff and landing only, and only in Phase II operations. The area on the surface described by the term "only for the purpose of takeoff and landing" is the traffic pattern. For the purpose of this limitation, the term "only for the purpose of takeoff and landing" does not allow multiple traffic patterns for operations such as training or maintenance checks.	
160.	Visual Meteorological Condition (VMC) and Instrument Flight Rules (IFR) Operations	Recommend day VMC operations only. If IFR operations are permitted, prohibit operations in known icing conditions—aircraft is not properly equipped for icing conditions. Comply with § 91.205.	
161.	Carrying of Passengers §91.319(a)(2)	Prohibit the carrying of passengers (and property) for compensation or hire at all times. For-hire flight training is permitted only in accordance with an FAA-issued letter of deviation authority (LODA). FAA LODA policy limits training to pilots eligible for T-33 experimental aircraft authorization.	
162.	Reduce Vertical Separation Minimums (RVSM)	Operations prohibited above RVSM altitudes (FL290). Note: Some Canadian T-33 aircraft may have airframe-specific operational limitations such as maximum operational altitude(s).	
163.	FL250 Limitation	Recommend T-33 operation be limited to 25,000 ft (FL250) due to the aircraft's pressurization system weaknesses. In fact, one T-33 operator limits its operations to a maximum cabin altitude of 25,000 ft.	
164.	High-Altitude Training	Recommend the PIC complete an FAA-approved physiological training course (for example, altitude chamber). Refer to FAA Civil Aerospace Medical Institute (CAMI) Physiology and Survival Training website for additional information. For example, a prominent T-33 operator's policy requires its T-33 pilots and crewmembers to attend altitude chamber training.	

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165.	PIC/Passenger Aeromedical Training	Properly train any passenger carried in the aircraft, in addition to the PIC. Such training should familiarize passengers with potential Aeromedical problems, which may occur during the flight. As an example in the USAF, passenger training is a one day course and includes approximately 6 hours of academic and chamber training. Passenger training academic requirements include— • Physiological Effects of Altitude, • Human Performance, • Oxygen Equipment, • Cabin Pressurization and Decompression, • Pressure Breathing, • Noise and Vibration, • Acceleration, • Physiological Aspects of Ejection Seat, • Parachute Training, • FAA approved ejection seat training. For additional information, refer to USAF Aerospace Physiology Program at http://ftp.rta.nato.int/public//PubFullText/RTO/MP/RTO-MP-021///$MP-021-13.PDF and Naval Aviation Survival Training Program (NASTP) at http://www.med.navy.mil/sites/nmotc/nsti/Pages/NASTPOverview.aspx.	
166.	Minimum Equipment for Flight	Ask the applicant to specify minimum equipment for flight and develop such a list consistent with the applicable military guidance (Canadian Armed Forces or USAF) and § 91.213. Note: One T-33 operator expects its T-33 pilots to use good judgment to make decisions on acceptable minimum equipment based on the anticipated conditions, including discussion with the chief pilot and maintenance experts. The operator reports it rarely operates with inoperative equipment, and its pilots and maintainers use a formalized problem reporting system to document reporting and repairing of aircraft squawks.	

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167.	Minimum Runway Length	Recommend a minimum runway length of 6,000 feet. In addition, the PIC must verify, using the appropriate aircraft performance charts (for example, the USAF "-1-1" Performance Supplement), sufficient runway length is available considering field elevation and atmospheric conditions. To add a margin of safety, use the following: <u>For Takeoff</u> • No person may initiate an airplane takeoff unless it is possible to stop the airplane safely on the runway, as shown by the accelerate-stop distance data, and to clear all obstacles by at least 50 ft vertically (as shown by the takeoff path data) or 200 ft horizontally within the airport boundaries and 300 ft horizontally beyond the boundaries, without banking before reaching a height of 50 ft (as shown by the takeoff path data) and after that without banking more than 15 degrees. • In applying this section, corrections must be made for any runway gradient. To allow for wind effect, takeoff data based on still air may be corrected by taking into account not more than 50 percent of any reported headwind component and not less than 150 percent of any reported tailwind component. <u>For Landing</u> • No person may initiate an airplane takeoff unless the airplane weight on arrival, allowing for normal consumption of fuel and oil in flight (in accordance with the landing distance in the AFM for the elevation of the destination airport and the wind conditions expected there at the time of landing), would allow a full stop landing at the intended destination airport within 60 percent of the effective length of each runway described below from a point 50 ft above the intersection of the obstruction clearance plane and the runway. For the purpose of determining the allowable landing weight at the destination airport, the following is assumed: o The airplane is landed on the most favorable runway and in the most favorable direction, in still air. o The airplane is landed on the most suitable runway considering the probable wind velocity and direction and the ground handling characteristics of that airplane, and considering other conditions such as landing aids and terrain.	
168.	Runway Considerations	Where appropriate, consider accelerate/stop distances, balanced field length, and critical field length principles in determining acceptable runway use per CJAA guidance. To enhance T-33 operations, it is recommended takeoff procedures similar to the USAF minimum acceleration check speed (using a ground reference during the takeoff run to check for a precalculated speed) be adopted. For landing, procedures similar to those described in § 91.1037 to allow a full stop landing within 80 percent of the effective length of each runway should also be used. T-33 operators should consider all available published performance data in making operating decisions, picking operating fields that give the most safety margin possible and not operating at airfields with marginal safety margins.	
169.	Runway Safety Areas (RSA)	Recommend restricting use to airports with appropriate runway safety areas (RSA) and Runway protection Zones (RPZ) to add a margin of safety. A runway safety area (RSA) is defined as the surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The RSA and RPZ standards are part of FAA's airport design standards. Refer to FAA AC 150/5300-13, Airport Design. In addition, where possible, recommend that standard USAF Potential Loss of Aircraft Zone (PLAZ) standards be used as well.	
170.	Jet Exhaust Dangers	Establish adequate jet blast safety procedures per the USAF-1 Flight Manual or equivalent Canadian Armed Forces manual. The CJAA Jet Manual can be used as reference.	
171.	Servicing	Ensure the applicant verifies ground personnel are trained for T-33 operations with an emphasis on the potential for fires during servicing. Prohibit non-trained personnel from servicing the aircraft. Note: Some T-33s may be instrumented for imperial gallons. Metric measurements are also possible.	

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172.	Fuel Contamination and the Use of Alcohol	Ensure the owner/operator tests and samples fuel before use and drains fuel tanks accordingly. Several T-33 accidents have occurred due to engine flameout caused by water contamination in the fuel. Unless not permitted in the AFM, recommend use of a fuel system icing inhibitor (FSII), that is, Prist, as a fuel additive. The use of an alcohol system (if installed) for inhibiting fuel system icing has been documented to dissolve critical magnesium components of the fuel control, causing fouling problems far worse than the icing difficulties. Note: Canadian T-33s may have a fuel heater installed.	
173.	Ground Support Equipment	Verify all required ground equipment is available and in a serviceable condition.	
174.	Aerial Target Towing	Restrict all towing. Notwithstanding the standard language in the FAA Order 8130.2 limitations concerning towing, the T-33 is not to be used for towing targets because such operations pose a danger to property and people on the ground and endanger the aircraft.	
175.	Personal Flight Equipment	Recommend the operator use the adequate personal flight equipment and attire to verify safe operations. This includes a helmet, oxygen mask, fire retardant (Nomex) flight suit, gloves (that is, Nomex or leather), adequate foot gear (that is, boots), and clothing that does not interfere with cockpit systems and flight controls. Operating with a live ejection seat requires a harness. Therefore, recommend only an approved harness compatible with the ejection seat be used.	
176.	Aircraft Rescue and Fire Fighting (ARFF) Coordination	Coordinate with ARFF personnel at any airport of landing (that is, safety briefing, ejection seat system).	
177.	Air Traffic Control (ATC) Coordination	Coordinate with ATC before any operation that may interfere with normal flow of traffic to ensure the requirement to avoid flight over populated areas is complied with. Note: ATC does not have the authority to waive any of the operating limitations or operating rules.	
178.	Military/Public Aircraft Operations	Some T-33 operators may enter into contracts with DOD to provide military missions such as air combat maneuvering (ACM), target towing, and ECM. Such operations constitute public aircraft operations (PAO), not civil operations under FAA jurisdiction. The operator is required to obtain a declaration of PAO from the contracting entity or risk civil penalty for operating the aircraft outside the limits of the FAA experimental certificate. Verify the operator understands the differences between PAOs and operations under a civil certificate. For example, the purpose of an airworthiness certificate in the exhibition category is limited to activities listed in § 21.191(d). Note: The following notice, which was issued by AFS-1 in March 2012, needs to be communicated to the applicant: "Any pilot operating a U.S. civil aircraft with an experimental certificate while conducting operations such as air-to-air combat simulations, electronic counter measures, target towing for aerial gunnery, and/or dropping simulated ordinances is operating *contrary* to the limits of the experimental certificate. Any operator offering to use a U.S. civil aircraft with an experimental certificate to conduct operations such as air-to-air combat simulations, electronic counter measures, target towing for aerial gunnery, and/or dropping simulated ordinances pursuant to a contract or other agreement with a foreign government or other foreign entity would not be doing so in accordance with any authority granted by the FAA as the State of Registry or State of the Operator. These activities are not included in the list of experimental certificate approved operations and may be subject to enforcement action by FAA. For those experimental aircraft operating overseas *within* the limitations of their certificate, FAA Order 8130.2G, section 7, paragraph 4071(b) states that if an experimental airworthiness certificate is issued to an aircraft located in or outside of the United States for time-limited operations in another country, the experimental airworthiness certificate must be accompanied by appropriate operating limitations that have been coordinated with the responsible CAA *before* issuance." For additional information on public aircraft status, refer to 76 FR 16349, Notice of Policy Regarding Civil Aircraft Operators Providing Contract Support to Government Entities (Public Aircraft Operations), dated March 23, 2011.	
179.	TO 00-80G-1 and Display Safety	Recommend the use of TO 00-80G-1, Make Safe Procedures for Public Static Display, dated November 30, 2002, in preparing for display of the aircraft. This document addresses public safety around aircraft in the air show/display environment. It covers hydraulics, egress systems, fuel, arresting hooks, electrical, emergency power, pneumatic, air or ground launched missiles, weapons release (including inert rounds), access panels, antennae, and other equipment that can create a hazard peculiar to certain aircraft.	

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T-33 Aircraft Flight Manual (AFM), SOPs, and Best Practices			
180.	AFM Addendums	Consider additions or restrictions to the AFM. Operational restrictions should be also addressed in the AFM.	
181.	T-33 Differences Training	Recommend the applicant/operator provide for differences in training between T-33 models. For example, if a pilot has had recent experience in a T-33A, transitioning to the CT-133 should include some training in the differences, such as differences in instrumentation, switches, and ejection seats.	
182.	In-Flight Canopy Separation	Revise the pilot checklist and back-seat occupant briefing to emphasize (that is, "warning—caution") the proper closing of the canopy.	
183.	V_{ne} and High-Speed Flight	The aircraft should be operated within the approved flight envelope. However, it is recommended that transonic operations by limited by 10 percent below MMO. This provides a good safety margin and could be addressed in the operating limitations, the AFM, and related standard operating procedures (SOP).	
184.	Aileron Deformation and Failure	Because air loads can result in aileron deformation and structural failure, carefully inspect the aileron before and after each flight. Some T-33 operators perform preflight and postflight inspections that include examining the ailerons.	
185.	Fuel Mismanagement	Require special emphasis on fuel starvation. There are issues with the fuel system, including fuel not feeding from tips, gages, fuel venting, and fuel leaks. An operation with fuel imbalances (that is, tip tanks asymmetry) is also a critical issue with the T-33.	
186.	G Loading to 3.5 G and -2 G and Restriction of Inverted Flight/Negative G to Under 10 Seconds	Advise the owner/operator to consider a G limitation, which may be needed for several reasons. In 1990, a CT-133 was destroyed due to catastrophic wing spar failure caused by negative bending overload. Fuel tip tanks are also an issue depending on configuration, that is, fuel tanks and level of fill. Consider restricting acrobatics as well (refer to *Restrict Acrobatics* above). In addressing this issue, the UK CAA noted that G loading to 3.5 G and -1.5 G and restrict inverted flight/negative G to under 10 seconds. On the issue of G limits, one T-33 operator restricts its operations to +5 G and -2G (the aircraft's book limits are +7.33 G and -4 G) and ensures its pilots are aware of the aircraft's capabilities.	
187.	Speed Limitations Due To Avionics and Other Equipment.	Verify the speed limit of the aircraft. Some T-33 operators may install certain types of avionics such as the Aspen EFD-1000 PFD Pro system. However, it is important to note the top speed of this installation is 450 knots. With some luggage carriers, the aircraft is limited to 325 knots.	
188.	Fuel Quantity Indicators	Inspect and introduce conservative flight times as a common practice. Recommend a personal minimum such as "70 gallons in the fuselage tank at the break." Note: Only the fuselage tank has a quantity indicator; all other tanks have only a low fuel pressure light.	
189.	Fuel Float Switches and Fuel Transfer	Ensure owners/operators do not conduct flights with fuel float failures. Fuel management in the T-33 can be challenging, as fuel floats (both leading edge and wing) have been known to not fully close, an issue addressed and emphasized in the AIP. In addition, recommend against using a "gang load approach" to fuel transfer because it can lead to a fuel starvation accident. This last happened to a civilian TV-2 in 2004. Note: Some T-33 operators check the fuel float switches for proper operation during conditional inspection and ground operational checks performed directly after starting the engine start. Ground personnel would see a large amount of fuel coming out of the Sabre drain if a fuel float were not operating properly. The "gang load approach" is dictated in the operator's manual for takeoff and landing.	
190.	External Tank(s) Failure	Restrict external tanks to only those cleared by the manufacturer. Adhere to the drop tank limitations related to (1) takeoff and landing performance, (2) G limits, (3) airspeed, and (4) fuel in the tanks. There should not be any means of jettisoning these tanks while on the ground or in flight. There should not be any modifications to the drop tanks.	

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191.	Over Rotation	Emphasize this concern. Over rotation is a common cause of T-33 accidents in both military and civilian aircraft.	
192.	Stalls	Recommend that training and SOPs address the particularities of stalling the T-33 in the configurations as provided in the applicable Flight Manual. For example, the T-33 usually exhibits a "bucking" motion after the stall in which the nose periodically rises and falls. However, the motion is not divergent unless aggravated by full aft stick or some other pro-spin control. This motion is not normally counted as departures, though its occurrance does serve as warning of impending departure if further misapplications of controls are made.	
193.	Nose Armament Doors	Require the latch mechanism be specifically included in the preflight inspection (AFM). In-flight opening of the armament bay doors has caused several T-33 accidents, including a recent accident in the United States (involving N3648). This is one of the most important safety issues with the T-33. One T-33 operator includes a walk-around in its preflight inspections that secures the nose armament bay doors and locks them with a special installed security device, and its SOP is that the pilot closes and locks the armament bay doors.	
194.	Aux. (Sucker) Doors	Recommend SOPs be considered to address a fire on takeoff related to the main fuel tank cap/seal leaking into the engine compartment (with open sucker doors) and the correct procedures to handle the emergency, that is, maintaining airspeed to close the doors and possibly put out the fire. Refer to the AFM for any procedures. Note: A center fuel cap was installed in only the earliest USAF T-33s, and should no longer be present in any operational T-33s.	
195.	Specific Range	Recommend SOPs addressing minimum landing fuel. Verify actual aircraft specific range (nautical air miles traveled per pound of fuel used).	
196.	Bingo and Minimum Landing Fuel	To add a safety margin, and in addition to § 91.151, Fuel Requirements for Flight in VFR Conditions, recommend establishing SOPs addressing minimum landing fuel for IFR operations as provided in § 91.167. In addition, a “Bingo” fuel status (a pre-briefed amount of fuel for an aircraft that would allow a safe return to the base of intended landing) should be used in all flights. Bingo fuel and minimum landing fuel are not necessarily the same in that a call for Bingo fuel and an RTB still required managing the minimum landing fuel. Note: One Canadian T-33 operator instructs its pilots to return to base at 150 imperial gallons and touch down with a minimum of 100 imperial gallons.	
197.	Difficult Taxiing	Emphasize taxiing the aircraft in training due to nose wheel configuration (not trailing) and no nose-wheel steering. Recommend it be emphasized in the AFM.	
198.	Suspected Flight Control Failure	Recommend establishing SOPs for post maintenance acceptance flights. Refer to military procedures manuals for guidance. Recommend avoiding troubleshooting suspected in-flight control failures.. One T-33 operator’s policy is to immediately recover the aircraft in the safest manner, not delay recovery by engaging in troubleshooting efforts. If a controllability check is warranted, the PIC would use their best judgment, based on the situation, to determine the best landing configuration and speed. However, it is noted that the issue in this case is to avoid exposing people and property on the ground to any dangerous operation with a potentially damaged aircraft. In other words, recovery of an aircraft at an airport that involves flight over a populated area is a concern.	
199.	MOD CF 751 Windscreen	Ensure operational restrictions with the one-piece windscreen are complied with. Many Canadian T-33/CT-133 have installed a production one-piece windscreen per MOD CF 751. Placement of any items on the upper windscreen bow or glare shield, except the Global Positioning System (GPS), is not permitted. Note: One experienced T-33 operator reports its aircraft were not modified by the Canadian Armed Forces per MOD CF 751, Windscreen, and its CT-133s were modified by installation of a one-piece windscreen installed in accordance with the manufacturer’s instructions and drawings. That operator also reports there are no approved mountings on the windscreen bow. The operator’s CT-133 standard glare shield is cardboard and canvas and not capable of holding anything else. The operator has also designed and fabricated its own ridged glare shield for improved operation capability and durability, and eliminated the original GPS mounting.	
200.	FAA AC 91-79	Recommend the use of FAA Advisory Circular AC 91-79, Runway Overrun Prevention. According to AC 91-79, safe landings begin long before touchdown. Adhering to SOPs and best practices for stabilized approaches will always be the first line of defense in preventing a runway overrun.	

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201.	Type Clubs or Organizations	Recommend the applicant/operator join a T-33 type club or organization. This facilitates safety information collection and dissemination.	
202.	Reporting Malfunctions and Defects	Ask the applicant/operator to report malfunctions and equipment defects found in maintenance, preflight, flight, and postflight inspection. This would yield significantly safety benefits to both operators and the FAA.	

Attachment 3—Additional Resources and Recommendations

Additional Resources

- Accident data (T-33) issued by the NTSB in the United States or other foreign investigative agencies (that is, USAF, UK AAIB, Germany's BFU).
- USAF T-33 Aircraft Accident Summary reports, 1951-1986.
- T-33 Maintenance and Engineering, http://www.t-33.us.
- Australia's CAAP 30-3(0), *Approved Maintenance Organization (AMO) - Limited Category Aircraft*, Civil Aviation Advisory Publication, December 2001. This publication addresses the restoration and maintenance of ex-military aircraft and is an excellent guide for developing adequate aircraft maintenance and inspection programs.
- CAP 632, *Operation of Permit to Fly Ex-Military Aircraft on the UK Register*. This is a comprehensive source of information and guidance on topics like technical requirements, specialist equipment and systems, pilot/crew qualification, operational requirements, records and oversight procedure, and safety management.
- Chamberlain, H. Dean. FAA News, *Armed and Dangerous,* November/December 2003.
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- FAA. AC 5220-9, *Aircraft Arresting Systems.*
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- NATOPS. NAVAIR 00-80R-14, *U.S. Navy Aircraft Firefighting and Rescue Manual*, October 15, 2003.
- NAVAIR 00-80T-109, *Aircraft Refueling NATOPS Manual*, June 15, 2002.
- *Naval Aviation Maintenance Program Standard Operating Procedures* (NAMPSOPs), chapter 10.
- NAVPERS 00-8-T-80, *Aerodynamics for Naval Aviators*, January 1965.
- New Zealand Civil Aviation Authority. AC 43-21, *Escape and Egress Systems*, December 25, 1997.
- Safety Regulation Group, Civil Aviation Authority (UK). CAA Document No. 743, *Civil Air Displays: A Guide for Pilots*, 2003.

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- UK CAA. Airworthiness Approval Note No. 26563.
- U.S. Department of Defense. Manual 4160.28 (volume 3), *Defense Demilitarization: Procedural Guidance*, June 7, 2011.
- USAF. AFP 127-1 and NAVAIR 00-80T-116-2, *Technical Manual Safety Investigation, Volume II Investigative Techniques*, July 31, 1987.
- USAF TO 1-1-300, *Maintenance Operational Checks and Flight Checks*, June 15, 2012.
- USAF TO 1-1-691, *Corrosion Prevention and Control Manual.*
- USAF TO 1-1A-1, *Engineering Handbook Series for Aircraft Repair, General Manual for Structural Repair*, November 15, 2006.

Recommendations for Review of Prior Actions

- As provided by § 91.415, review the submitted maintenance manual(s) and AIP. Work with the applicant to revise the AIP as needed based on any concerns identified in attachment 2 to this document. For example, a T-33 AIP can be modified to address or verify—
  - Consistency with the applicable military TOs for airframe, powerplant, and systems (that is, TO 1T-33A-6) to verify replacement/interval times are addressed.
  - All AIP section and subsections include the proper guidance/standards (that is, TOs or EOs) for all systems, groups, and tasks.
  - No "on condition" for items that have replacement times unless proper technical data to substantiate the change, that is, aileron boost and oxygen regulator.
  - Ejection seat system replacement times are adhered to. No "on condition" for rocket moors and propellants. Make the distinction between replacement times, that is, "shelf life" vs. "installed life limit."
  - Any deferred log is related to a listing of minimum equipment for flight.
  - Inclusion of document revision page(s).
- Request a detailed program letter from the applicant to verify proposed operations are consistent with the purpose of the airworthiness certificate. For example, there may be a need to review the proposed airports to be used.
- Verify the application for airworthiness does not constitute brokering. Section 21.191(d) was not intended to allow for the brokering or marketing of experimental aircraft. This includes individuals who manufacture, import, or assemble aircraft, and then apply for and receive experimental exhibition airworthiness certificates so they can sell the aircraft to buyers. Section 21.191(d) only provides for the exhibition of an aircraft's flight capabilities, performance, or unusual characteristics at air shows, and for motion picture, television, and similar productions. Certificating offices must verify all applications for exhibition airworthiness certificates are for the purposes specified under § 21.191(d) and are from the registered owners who will exhibit the aircraft for those purposes. Applicants must also provide the applicable information specified in § 21.193.
- Review any related documents from U.S. Customs and Border Protection and the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) for the aircraft. If the aircraft was not imported as an aircraft, or if the aircraft configuration is not as stated in Form ATF-6, it may not be eligible for an airworthiness certificate. There are many cases in which Federal authorities have questioned the origin of an Ex-Canadian T-33 and its installed weapon system. Some have been seized.

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Fixed Wing Aircraft Structural Life Limits, NAVAIRINST 13120.1.
Department of Defense MANUAL 4160.28, Volume 3, June 7, 2011 *Defense Demilitarization: Procedural Guidance.*
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Attachment 5—Partial Listing of T-33 Accidents and Relevant Incidents

#	Date	Version	Operator	Severity	Probable Cause and Remarks
1.	January 2013	T-33 Mk.3	Bolivian AF	Non-Fatal	Nose Gear Failure – Ruwnay Excursion
2.	June 15, 2012	T-33 Mk.3	C-FRGA	Non-Fatal	Main Landing Gear on Landing
3.	February 3, 2012	T-33 Mk.3	N333MJ	Non-Fatal	Gear-Up (Landing Gear Pins)
4.	May 29, 2011	T-33A	N132GB	Non-Fatal	Crash Landing (Generator Failure)
5.	February 18, 2011	T-33 Mk.3	N134EM	Non-Fatal	Landing Gear Collapse on Takeoff
6.	March 26, 2010	T-33A	N132GB	Non-Fatal	Emergency Landing (Generator Failure)
7.	September 13, 2009	T-33 Mk.3	Bolivian AF	Non-fatal	Runway Excursion
8.	July 15, 2009	T-33 Mk.3	N3648	Non-Fatal	Weapon Doors Open in Flight - Runway Excursion
9.	September 6, 2006	T-33 Mk3	G-TBRD	Non-Fatal	LOC on Takeoff (Over Rotation)
10.	May 28, 2004	TV-2	N6617	Non-Fatal	Fuel System Emergency - Runway Excursion
11.	November 2, 2003	T-33 Mk3	N99192	Fatal	Low Altitude Maneuvering
12.	Juen 20, 2003	T-33 Mk. 3	G-TBRD	Nonfatal	Runway Excursion
13.	May 16, 2003	T-33 Mk.3	Bolivian AF	Fatal (2)	Landing Accident (DBR)
14.	April 16, 2003	T-33A	Mexican AF	Unknown	Engine Failure (Disintegration)
15.	July 2002	T-33 Mk.	Bolivian AF	Non-Fatal	Hydraulic Failure
16.	November 22, 1999	T-33A	JSDAF	Fatal (2)	Engine Fire (Fuel Line)
17.	September 22, 1999	T-33A	Mexican AF	Unknown	Unknown
18.	September 7, 1996	T-33 Mk.3	N99195	Non-Fatal	LOC on Takeoff (No Flaps)
19.	April 2, 1997	T-33A	Mexican AF	Unknown	Unknown
20.	1997	T-33 Mk.3	Bolivian AF	Unknown	In-Flight Explosion
21.	April 15, 1996	T-33A	Mexican AF	Unknown	Unknown
22.	April 1996	T-33A	Paraguay AF	Non-Fatal	Landing Accident
23.	September 16, 1995	T-33A	Mexican AF	Fatal (2)	Mid-Air (1st Aircraft)
24.	September 16, 1995	T-33A	Mexican AF	Fatal (2)	Mid-Air (2nd Aircraft)
25.	September 16, 1995	T-33A	Mexican AF	Fatal (1)	Mid-Air (3rd Aircraft)
26.	1995	T-33A	Ecuadorian AF	Unknown	Unknown
27.	September 30, 1984	T-33 Mk.3	N12422	Non-fatal	LOC Short Final
28.	September 14, 1994	T-33 Mk.3	RCAF	Unknown	Unknown
29.	July 31, 1994	T-33 MK.3	RCAF	Fatal	Possible Engine Failure
30.	June 11, 1994	T-33 Mk.3	N99195	Fatal	LOC (Acrobatics at Low Altitude)
31.	December 17, 1993	T-33A	Thai AF	Non-Fatal	Fire in the Cockpit
32.	November 25, 1992	T-33A	Thai AF	Unknown	Unknown
33.	September 1992	T-33 Mk/3	Bolivian AF	Unknown	Unknown
34.	March 21, 1992	T-33A	Mexican AF	Unknown	Unknown
35.	February 1992	T-33 Mk.3	Bolivian AF	Unknown	Unknown
36.	October 19, 1991	T-33 Mk/3	Bolivian AF	Fatal (2)	Unknown
37.	October 17, 1991	CT-133	RCAF	Fatal (2)	Special Disorientation
38.	September 20, 1991	T-33A	Portuguese AF	Unknown	Engine Failure
39.	May 8, 1991	T-33A	Ecuadorian AF	Unknown	Unknown
40.	May 4, 1990	CT-133	N233RK	Fatal (2)	Wing Spar Failure (Overstressed Airframe)

#	Date	Version	Operator	Severity	Probable Cause and Remarks
41.	February 16, 1990	CT-133	RCAF	Non-Fatal	Unknown
42.	December 17, 1989	T-33A	Colombian AF	Unknown	Unknown
43.	May 22, 1989	T-33 Mk.3	Bolivian AF	Fatal (2)	Unknown
44.	May 5, 1989	T-33A	ROCAF	Fatal (2)	Unknown
45.	May 1988	T-33 Mk/3	Bolivian AF	Unknown	Unknown
46.	August 31, 1987	RT-33A	Thai AF	Unknown	Unknown
47.	July 19, 1987	T-33A	Thai AF	Unknown	Unknown
48.	September 15, 1987	T-33A	Thai AF	Fatal	Lost at Sea
49.	July 24, 1987	T-33A	Thai AF	Unknown	Unknown
50.	April 7, 1987	T-33 Mk.3	RCAF	Unknown	Unknown
51.	March 9, 1987	T-33A	Thai AF	Unknown	Unknown
52.	October 24, 1986	T-33A	USAF	Fatal	Lost at Sea
53.	May 26, 1986	T-33 Mk.3	RCAF	Unknown	Unknown
54.	January 28, 1986	T-33A	Thai AF	Fatal	In-Flight Explosion (1 Ejection)
55.	October 25, 1985	T-33A	Thai AF	Fatal (2)	Unknown
56.	January 10, 1985	T-33A	Portuguese AF	Non-Fatal	Engine Fire On Takeoff
57.	January 1985	T-33A	Portuguese AF	Non-Fatal	LOC on the Runway
58.	November 29, 1984	T-33A	Turkish AF	Non-Fatal	Engine Failure
59.	September 14, 1984	T-33 Mk.3	RCAF	Unknown	Unknown
60.	June 21, 1984	T-33A	JSDAF	Non-Fatal	Overrun
61.	December 23, 1983	T-33A	Thai AF	Non-Fatal	Engine Fire (Explosion) Ejections
62.	August 27, 1983	T-33 Mk.3	Bolivian AF	Non-Fatal	Unknown
63.	July 6, 1983	T-33A	Thai AF	Unknown	Unknown
64.	May 9, 1983	T-33A	USAF	Fatal (2)	Undershoot
65.	November 30, 1982	T-33A	USAF	Unknown	Unknown
66.	October 10, 1982	T-33 Mk.3	Bolivian AF	Non-Fatal	Mid-Air
67.	September 21, 1982	T-33 Mk.3	RCAF	Unknown	Unknown
68.	May 26, 1982	T-33 Mk.3	RCAF	Unknown	Unknown
69.	April 9, 1982	T-33A	USAF	Non-Fatal	In-Flight Fire
70.	February 27, 1982	T-33 Mk.3	RCAF	Unknown	Unknown
71.	December 3, 1981	T-33A	Mexican AF	Fatal	Mechanical (1 Ejection)
72.	December 1981	T-33A	Portuguese AF	Non-Fatal	Final Approach (Weather)
73.	September 27, 1981	T-33A	JSDAF	Unknown	Mid-Air
74.	September 21, 1981	T-33A	French AF	Unknown	Unknown
75.	September 17, 1981	T-33A	JSDAF	Unknown	Unknown
76.	September 14, 1981	T-33A	USAF	Unknown	Unknown
77.	September 8, 1981	T-33A	JSDAF	Fatal (2)	Unknown
78.	June 21, 1981	T-33A	USAF	Unknown	Unknown
79.	April 20, 1981	T-33A	USAF	Unknown	Unknown
80.	February 14, 1981	T-33 Mk.3	RCAF	Unknown	Crashed on Approach
81.	January 11, 1981	T-33A	Colombian AF	Unknown	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
82.	August 15, 1980	T-33 Mk.3	Bolivian AF	Fatal	Engine Fire
83.	March 26, 1980	T-33A	Mexican AF	Fatal (2)	Unknown
84.	March 25, 1980	T-33	French AF	Unknown	Unknown
85.	February 27, 1980	T-33 Mk.3	Bolivian AF	Non-Fatal	Unknown
86.	February 16, 1980	T-33 Mk.3	RCAF	Unknown	Unknown
87.	August 15, 1979	T-33 Mk.3	Bolivian AF	Fatal	Hard Landing (DBR)
88.	July 9, 1979	T-33A	N12420	Non-Fatal	Hit Animals on Taxiway Takeoff
89.	June 30, 1979	T-33A	USAF	Unknown	Unknown
90.	April 19, 1979	T-33 Mk.3	Bolivian AF	Non-Fatal	Hard Landing (DBR)
91.	March 24, 1979	T-33A	Belgian AF	Unknown	Unknown
92.	January 5, 1979	T-33A	Portuguese AF	Fatal (2)	Landing Accident
93.	November 21, 1978	T-33A	Colombian AF	Unknown	Unknown
94.	July 17, 1978	T-33A	Mexican AF	Fatal (4)	Engine Failure (Crashed Into School)
95.	June 10, 1978	T-33A	Italian AF	Unknown	Unknown
96.	May 27, 1978	TV-2	N1118U	Non-Fatal	Landing Accident
97.	November 18, 1977	T-33A	Belgian AF	Fatal (2)	CFIT
98.	September 22, 1977	T-33A	USAF	Non-Fatal	Unknown
99.	August 9, 1977	T-33 Mk.3	Bolivian AF	Non-Fatal	Landing Accident
100.	June 13, 1977	T-33A	Belgian AF	Fatal	Mechanical Failure
101.	June 5, 1977	T-33 Mk.3	Bolivian AF	Non-Fatal	Takeoff Accident
102.	April 27, 1977	T-33A	Belgian AF	Non-Fatal	Mid-Air (2nd Aircraft)
103.	April 27, 1977	T-33A	Belgian AF	Non-Fatal	Mid-Air (1st Aircraft)
104.	April 3, 1977	T-33A	USAF	Unknown	Unknown
105.	April 1977	T-33 Mk.3	Bolivian AF	Unknown	Unknown
106.	March 22, 1977	T-33A	USAF	Unknown	Unknown
107.	February 11, 1977	T-33A	USAF	Unknown	Unknown
108.	December 19, 1976	T-33A	USAF	Unknown	Unknown
109.	December 8, 1976	T-33A	N29147	Unknown	Unknown
110.	November 1976	RT-33A	Colombian AF	Unknown	Unknown
111.	August 11, 1976	T-33A	Colombian AF	Unknown	Unknown
112.	May 28, 1976	T-33 Mk.3	Bolivian AF	Fatal	Mid-Air (1st Aircraft)
113.	May 28, 1976	T-33 Mk.3	Bolivian AF	Non-Fatal	Mid-Air (2nd Aircraft)
114.	April 27, 1976	T-33A	USAF	Unknown	Unknown
115.	March 26, 1976	T-33A	Belgian AF	Unknown	Unknown
116.	February 18, 1976	T-33A	USAF	Fatal (2)	Takeoff
117.	February 1, 1976	T-33 Mk.3	RCAF	Fatal	Engine Fire
118.	December 5, 1975	T-33AF	French AF	Non-Fatal	Landing Gear Failure
119.	October 22, 1975	T-33A	Brazilian AF	Unknown	Unknown
120.	October 13, 1975	T-33SF	French AF	Non-Fatal	Turbine Failure (fatigue)
121.	October 6, 1975	T-33SF	French AF	Non-Fatal	Ground Accident (Aircraft Not Destroyed)
122.	July 23, 1975	T-33SF	French AF	Non-Fatal	Spin

#	Date	Version	Operator	Severity	Probable Cause and Remarks
123.	May 30, 1975	T-33A	USAF	Fatal (2)	Landed Short
124.	May 8, 1975	T-33A	USAF	Unknown	Unknown
125.	May 3, 1975	T-33B	USMC	Unknown	Unknown
126.	April 25, 1975	T-33A	French AF	Non-Fatal	Battery Explosion on the Ground
127.	March 17, 1975	T-33B	USMC	Unknown	Unknown
128.	February 27, 1975	T-33 Mk.3	Bolivian AF	Fatal	Unknown
129.	February 27, 1975	T-33A	USAF	Fatal (2)	Unknown
130.	February 21, 1975	T-33A	USAF	Non-Fatal	Engine Flameout
131.	May 21, 1975	T-33A	USAF	Non-Fatal	Engine Failure
132.	December 4, 1974	T-33A	Luftwaffe	Unknown	Unknown
133.	September 11, 1974	T-33A	USAF	Fatal (2)	Pilot Incapacitation (Non-Pilot on Board)
134.	August 14, 1974	T-33A	Thai AF	Non-Fatal	Nose Wheel Failure
135.	July 2, 1974	T-33A	Luftwaffe	Unknown	Unknown
136.	June 14, 1974	T-33A	N4TM	Non-Fatal	In-Flight Structural Damage (Turbulence)
137.	February 20, 1974	T-33 Mk.3	RCAF	Unknown	Unknown
138.	December 27, 1973	T-33 Mk.3	Bolivian AF	Unknown	Unknown
139.	May 3, 1973	T-33A	Bolivian AF	Unknown	Unknown
140.	March 21, 1973	T-33A	Italian AF	Fatal (2)	LOC
141.	March 16, 1973	T-33A	Luftwaffe	Unknown	Unknown
142.	January 24, 1973	TV-2	N152	Fatal	FAA - PIC Heart Attack
143.	January 9, 1973	T-33A	Thai AF	Fatal	In-Flight Explosion
144.	November 1972	RT-33A	Colombian AF	Unknown	Unknown
145.	July 5, 1972	T-33A	Thai AF	Non-Fatal	Mid-Air With Civilian DC-3
146.	June 28,1 972	T-33A	USAF	Unknown	Unknown
147.	June 6, 1972	RT-33A	Thai AF	Fatal	In-Flight Explosion
148.	April 11, 1972	T-33A	USAF	Fatal (2)	Approach
149.	April 6, 1972	T-33A	Luftwaffe	Non-Fatal	Unknown
150.	March 15, 1972	T-33A	Thai AF	Unknown	Landing Accident
151.	February 9, 1972	T-33A	JSDAF	Unknown	Unknown
152.	1972	T-33A	Thai AF	Unknown	Unknown
153.	1972	T-33A	Uruguayan AF	Unknown	Unknown
154.	December 17, 1971	T-33A	Uruguayan AF	Unknown	Unknown
155.	November 12, 1971	T-33A	Dutch AF	Unknown	Unknown
156.	October 29, 1971	T-33A	USAF	Non-Fatal	Engine Failure
157.	October 12, 1971	T-33A	Dutch AF	Unknown	Unknown
158.	September 15, 1971	T-33 Mk.3	RCAF	Unknown	Unknown
159.	August 20, 1971	T-33A	Pakistan AF	Fatal (2)	Defection
160.	July 18, 1971	T-33A	USAF	Unknown	Unknown
161.	June 10, 1971	T-33A	Dutch AF	Unknown	Unknown
162.	March 26, 1971	T-33A	Danish AF	Non-Fatal	Unknown
163.	December 4, 1970	TV-2	N156	Non-Fatal	FAA - Engine Failure (Destroyed)

#	Date	Version	Operator	Severity	Probable Cause and Remarks
164.	November 11, 1970	T-33	French AF	Unknown	Unknown
165.	November 2, 1970	T-33	French AF	Unknown	Unknown
166.	September 30, 1970	T-33A	Brazilian AF	Unknown	Unknown
167.	September 30, 1970	T-33A	Brazilian AF	Unknown	Unknown
168.	July 10, 1970	TV-2	N156	Non-Fatal	FAA - Electrical System Failure - Engine Failure
169.	June 23, 1970	T-33A	Dutch AF	Unknown	Unknown
170.	June 23, 1970	T-33A	Thai AF	Unknown	Unknown
171.	June 23, 1970	T-33A	Thai AF	Non-Fatal	Engine Failure (Ejections)
172.	June 19, 1970	T-33A	USAF	Unknown	Mid-Air With Civilian Aircraft
173.	June 10, 1970	T-33A	Dutch AF	Unknown	Unknown
174.	May 22, 1970	T-33A	USAF	Fatal (2)	Unknown
175.	October 25, 1969	T-33A	USAF	Fatal (2)	Unknown
176.	September 24, 1969	T-33A	Colombian AF	Unknown	Unknown
177.	August 27, 1969	T-33A	JSDAF	Unknown	Unknown
178.	July 30, 1969	T-33A	Luftwaffe	Unknown	Unknown
179.	July 30, 1969	T-33A	Luftwaffe	Unknown	Unknown (2nd Aircraft)
180.	June 26, 1969	T-33A	USAF	Fatal (2)	Unknown
181.	June 3, 1969	T-33A	Brazilian AF	Unknown	Unknown
182.	May 9, 1969	T-33A	Colombian AF	Unknown	Unknown
183.	January 17, 1969	T-33A	Brazilian AF	Unknown	Unknown
184.	January 6, 1969	T-33A	JSDAF	Unknown	Unknown
185.	1969	T-33A	Luftwaffe	Unknown	Unknown
186.	September 19, 1968	T-33A	N106D	Non-Fatal	Engine Fire and Explosion - Successful Ejection
187.	August 28, 1968	T-33A	N155	Non-Fatal	Gear-Up Landing
188.	August 1, 1968	T-33A	JSDAF	Unknown	Unknown
189.	August 9, 1968	T-33A	Danish AF	Unknown	Unknown
190.	June 11, 1968	T-33A	Turkish AF	Fatal (2)	Unknown
191.	May 22, 1968	T-33 Mk.3	RCAF	Fatal	Low Altitude Maneuvering
192.	May 2, 1968	T-33A	Luftwaffe	Unknown	Unknown
193.	April 16, 1968	T-33A	USAF	Fatal (2)	CFIT
194.	March 29, 1968	T-33A	Luftwaffe	Unknown	Unknown
195.	February 11, 1968	TV-2	U.S. Navy (USN)	Unknown	Unknown
196.	February 23, 1968	T-33A	USAF	Non-Fatal	Unknown
197.	February 11, 1968	TV-2	USN	Fatal (2)	Collision With Bridge
198.	January 1968	T-33A	Brazilian AF	Unknown	Unknown
199.	March 1968	T-33A	Brazilian AF	Fatal	Crash Landing (Possible Engine Failure)
200.	November 30, 1967	T-33A	Colombian AF	Unknown	Unknown
201.	November 28, 1967	T-33A	Luftwaffe	Unknown	Unknown
202.	November 21, 1957	T-33A	Luftwaffe	Unknown	Unknown
203.	November 11, 1967	T-33A	Portuguese AF	Unknown	Engine Failure
204.	September 22, 1967	T-33A	JSDAF	Unknown	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
205.	September 12, 1967	T-33A	Mexican AF	Non-Fatal	Engine Fire on Takeoff
206.	July 18, 1967	T-33A	Brazilian AF	Fatal	Mid-Air
207.	July 13, 1967	T-33A	Danish AF	Unknown	Unknown
208.	June 27, 1967	T-33A	Brazilian AF	Unknown	Unknown
209.	May 11, 1967	T-33A	Norwegian AF	Non-Fatal	Unknown
210.	May 5, 1967	T-33A	Luftwaffe	Unknown	Unknown
211.	April 26, 1967	T-33A	JSDAF	Unknown	Mid-Air
212.	March 10, 1967	T-33A	Mexican AF	Fatal (2)	In-Flight Explosion
213.	March 3, 1967	T-33A	Luftwaffe	Unknown	Unknown
214.	February 6, 1967	T-33A	Dutch AF	Fatal (2)	Spin
215.	February 1, 1967	T-33A	JSDAF	Unknown	Unknown
216.	January 18, 1967	T-33	French AF	Unknown	Unknown
217.	December 2, 1966	T-33A	USAF	Non-Fatal	Mid-Air (1st Aircraft)
218.	December 2, 1966	T-33A	USAF	Non-Fatal	Mid-Air (2nd Aircraft)
219.	November 19, 1966	T-33B	USN	Unknown	Unknown
220.	October 10, 1966	TV-2	N155	Non-Fatal	FAA - Brake Failure
221.	October 3, 1966	T-33A	Belgian AF	Non-Fatal	Engine Failure
222.	September 26, 1967	T-33A	Guatemalan AF	Unknown	Unknown
223.	September 12, 1967	T-33A	Mexican AF	Non-Fatal	Engine Fire on Takeoff
224.	July 13, 1967	T-33A	Danish AF	Non-Fatal	Unknown
225.	April 26, 1967	T-33A	JSDAF	Non-Fatal	Mid-Air
226.	March 3, 1967	T-33A	Luftwaffe	Unknown	Unknown
227.	February 20, 1967	T-33A	Dutch AF	Unknown	Unknown
228.	February 15, 1967	T-33 Mk.3	RCAF	Fatal	Mid-Air
229.	February 6, 1967	T-33A	Dutch AF	Unknown	Unknown
230.	October 3, 1966	T-33A	Belgian AF	Non-Fatal	Engine Failure
231.	October 3, 1966	T-33A	Guatemalan AF	Unknown	Unknown
232.	August 25, 1966	T-33A	USAF	Fatal (2)	Unknown
233.	July 13, 1966	T-33A	Colombian AF	Unknown	Unknown
234.	April 16, 1966	T-33A	Luftwaffe	Unknown	Unknown
235.	May 1966	T-33A	Guatemalan AF	Fatal (2)	Unknown
236.	January 18, 1966	T-33A	Luftwaffe	Unknown	Unknown
237.	January 17, 1966	T-33A	USAF	Fatal (2)	Unknown
238.	December 30, 1965	T-33A	Colombian AF	Unknown	Unknown
239.	December 22, 1965	T-33A	USAF	Non-Fatal	Engine Failure (Explosion)
240.	November 8, 1965	T-33A	Luftwaffe	Unknown	Unknown
241.	October, 29, 1965	T-33	French AF	Unknown	Unknown
242.	October 14, 1965	T-33A	Luftwaffe	Unknown	Unknown
243.	October 1, 1965	T-33A	Luftwaffe	Unknown	Unknown
244.	July 27, 1965	T-33A	USAF	Fatal (2)	Weather

#	Date	Version	Operator	Severity	Probable Cause and Remarks
245.	June 28, 1965	T-33A	Thai AF	Fatal (2)	Engine Failure in the Pattern
246.	June 22, 1965	T-33A	Brazilian AF	Unknown	Unknown
247.	June 8, 1965	T-33A	Dutch AF	Fatal	Mid-Air (1st Aircraft)
248.	June 8, 1965	T-33A	Dutch AF	Fatal	Mid-Air (2nd Aircraft)
249.	April 7, 1965	T-33A	Norwegian AF	Fatal (2)	Unknown
250.	March 25, 1965	T-33A	JSDAF	Unknown	Unknown
251.	February 2, 1965	T-33A	Luftwaffe	Unknown	Unknown
252.	January 23, 1965	T-33 Mk.3	French AF	Fatal	Unknown
253.	January 21, 1965	T-33A	Luftwaffe	Unknown	Unknown
254.	January 1965	T-33	French AF	Unknown	Unknown
255.	November 19, 1964	T-33A	Luftwaffe	Non-Fatal	Unknown
256.	November 15, 1964	T-33A	Norwegian AF	Fatal (2)	CFIT
257.	October 19, 1964	T-33A	Danish AF	Non-Fatal	Hangar Fire (1st Aircraft)
258.	October 19, 1964	T-33A	Danish AF	Non-Fatal	Hangar Fire (2nd Aircraft)
259.	October 1, 1964	T-33A	Luftwaffe	Unknown	Unknown
260.	September 15, 1964	T-33A	Luftwaffe	Fatal	Engine Failure
261.	July 14, 1964	T-33A	Luftwaffe	Unknown	Unknown
262.	May 27, 1964	T-33A	Dutch AF	Unknown	Unknown
263.	May 12, 1964	T-33A	Norwegian AF	Non-Fatal	Unknown
264.	May 5, 1964	T-33A	Danish AF	Non-Fatal	Unknown
265.	April 28, 1964	T-33A	Luftwaffe	Unknown	Unknown
266.	March 3, 1964	T-33A	JSDAF	Unknown	Unknown
267.	February 6, 1964	T-33A	USAF	Unknown	Unknown
268.	January 1, 1964	T-33A	Norwegian AF	Fatal (2)	Weather
269.	November 27, 1963	T-33A	USAF	Unknown	Unknown
270.	November 26, 1963	T-33A	USAF	Unknown	Unknown
271.	November 22, 1963	T-33A	USAF	Non-Fatal	Unknown
272.	October 1, 1953	T-33A	USAF	Non-Fatal	Engine Failure
273.	August 21, 1963	T-33 Mk3	RCAF	Fatal	Low Altitude Maneuvering
274.	July 23, 1963	T-33A	Dutch AF	Unknown	Unknown
275.	July 23, 1963	T-33A	Luftwaffe	Unknown	Unknown
276.	July 9, 1963	T-33A	Dutch AF	Unknown	Unknown
277.	July 1963	T-33A	Dutch AF	Unknown	Unknown
278.	May 28, 1963	T-33A	JSDAF	Unknown	Unknown
279.	May 9, 1963	T-33A	USAF	Non-Fatal	Unknown
280.	April 30, 1963	T-33A	USAF	Non-Fatal	Unknown
281.	April 14, 1963	T-33A	USAF	Non-Fatal	Unknown
282.	April 10, 1963	T-33A	USAF	Fatal (2)	Unknown
283.	March 25, 1963	T-33A	Luftwaffe	Unknown	Unknown
284.	March 18, 1963	T-33A	USAF	Unknown	Unknown
285.	February 15, 1963	T-33A	USAF	Unknown	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
286.	February 7, 1963	T-33A	Dutch AF	Unknown	Unknown
287.	January 19, 1963	T-33A	USAF	Unknown	Unknown
288.	January 18, 1963	T-33A	USAF	Fatal (2)	Unknown
289.	January 4, 1963	T-33B	USN	Unknown	Unknown
290.	January 3, 1963	T-33A	USAF	Unknown	Unknown
291.	December 19, 1962	T-33A	Dutch AF	Unknown	Unknown
292.	December 9, 1962	T-33A	Dutch AF	Unknown	Unknown
293.	December 8, 1962	T-33A	USAF	Unknown	Unknown
294.	December 7, 1963	LT-33	USN	Unknown	Unknown
295.	December 7, 1962	T-33A	USAF	Fatal (2)	Unknown
296.	November 27, 1962	T-33A	Norwegian AF	Non-Fatal	Engine Failure
297.	November 1, 1962	T-33A	USAF	Fatal (2)	LOC During Acrobatics (At Altitude)
298.	November 1, 1962	T-33A	USAF	Unknown	Unknown
299.	October 22, 1962	T-33A	USAF	Fatal	Unknown
300.	September 25, 1962	T-33A	USAF	Fatal (2)	Unknown
301.	August 16, 1962	T-33A	Luftwaffe	Unknown	Unknown
302.	July 25, 1962	RT-33A	Italian AF	Non-Fatal	Mid-Air
303.	July 13, 1962	T-33A	Luftwaffe	Unknown	Unknown
304.	June 16, 1962	T-33A	JSDAF	Unknown	Unknown
305.	June 8, 1962	T-33A	USAF	Fatal (6)	Mid-Air
306.	June 2, 1962	Luftwaffe	Unknown	Unknown	Luftwaffe
307.	May 19, 1962	T-33A	USAF	Non-Fatal	Undershoot
308.	May 8, 1962	T-33A	Luftwaffe	Fatal	Mid-Air (1st Aircraft)
309.	May 8, 1962	T-33A	Luftwaffe	Fatal	Mid-Air (2nd Aircraft)
310.	April 12, 1962	T-33A	Luftwaffe	Unknown	Unknow1
311.	April 11, 1962	T-33A	JSDAF	Fatal	Unknown
312.	April 11, 1962	T-33A	USAF	Fatal (2)	Unknown
313.	March 19, 1962	AT-33	USAF	Non-Fatal	Undershoot
314.	March 12, 1962	T-33A	JSDAF	Unknown	Unknown
315.	January 27, 1962	T-33A	Norwegian AF	Non-Fatal	Unknown
316.	January 26, 1962	T-33A	Luftwaffe	Unknown	Unknown
317.	January 12, 1962	T-33A	USAF	Unknown	Unknown
318.	January 7, 1962	T-33A	USAF	Non-Fatal	Canopy Separated in Flight (AC Not Destroyed)
319.	December 13, 1961	T-33A	Belgian AF	Unknown	Unknown
320.	December 12, 1961	T-33A	USAF	Unknown	Unknown
321.	December 5, 1961	T-33A	USAF	Non-Fatal	Mid-Air
322.	December 5, 1961	T-33 Mk.3	RCAF	Unknown	Mid-Air
323.	November 18, 1961	T-33A	Luftwaffe	Unknown	Unknown
324.	November 10, 1961	T-33A	Luftwaffe	Unknown	Unknown
325.	October 21, 1961	T-33A	Belgian AF	Non-Fatal	Mechanical Failure (Crash Landing)
326.	September 7, 1961	T-33A	JSDAF	Unknown	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
327.	September 2, 1961	T-33A	USAF	Non-Fatal	Engine Failure - Emergency Landing (G. Grissom)
328.	July 11, 1961	T-33A	Belgian AF	Unknown	Unknown
329.	July 5, 1961	T-33A	JSDAF	Fatal	Mid-Air
330.	July 5, 1961	T-33A	JSDAF	Fatal	Mid-Air
331.	June 20, 1961	T-33A	USAF	Unknown	Unknown
332.	June 17, 1961	T-33A	USAF	Fatal	Engine Failure
333.	June 4, 1961	T-33A	USAF	Non-Fatal	Engine Failure
334.	April 10, 1961	T-33A	Luftwaffe	Unknown	Unknown
335.	April 8, 1961	T-33A	USAF	Non-Fatal	FCU Failure (Aircraft Not Destroyed)
336.	March 15, 1961	T-33A	USAF	Fatal	Unknown
337.	January 21, 1961	T-33	French AF	Unknown	Unknown
338.	January 4, 1961	T-33A	Luftwaffe	Unknown	Unknown
339.	December 1, 1960	T-33A	USAF	Unknown	Unknown
340.	November 15, 1960	T-33A	Luftwaffe	Fatal	Unknown
341.	November 11, 1960	T-33A	Luftwaffe	Unknown	Unknown
342.	October 1, 1960	T-33A	USAF	Unknown	Unknown
343.	August 4, 1960	T-33A	JSDAF	Unknown	Unknown
344.	July 27, 1960	T-33A	USAF	Non-Fatal	Ground Fire
345.	June 25, 1960	T-33A	Luftwaffe	Fatal(2)	CFIT (1st Aircraft)
346.	June 25, 1960	T-33A	Luftwaffe	Fatal(2)	CFIT (2nd Aircraft)
347.	June 22, 1960	T-33A	Luftwaffe	Unknown	Unknown
348.	June 15, 1960	T-33A	Belgian AF	Unknown	Engine Flameout
349.	June 17, 1960	T-33A	JSDAF	Unknown	Unknown
350.	May 25, 1960	T-33A	USAF	Unknown	Unknown
351.	March 28, 1960	T-33A	USAF	Unknown	Unknown
352.	February 28, 1960	T-33A	Norwegian AF	Non-Fatal	Possible Engine Failure
353.	February 12, 1960	TV-2	N153	Non-Fatal	FAA - Unknown
354.	February 8, 1960	T-33A	USAF	Unknown	Unknown
355.	January 20, 1960	T-33A	USAF	Non-Fatal	Unknown
356.	January 20, 1960	T-33A	USAF	Non-Fatal	Unknown
357.	January 15, 1960	T-33A	Norwegian AF	Fatal (2)	Unknown
358.	January 14, 1960	T-33A	USAF	Non-Fatal	Mid-Air (1st Aircraft)
359.	January 14, 1960	T-33A	USAF	Non-Fatal	Mid-Air (2nd Aircraft)
360.	January 14, 1960	T-33A	USAF	Non-Fatal	Unknown
361.	January 7, 1960	T-33A	USAF	Non-Fatal	Unknown
362.	January 7, 1960	T-33A	USAF	Non-Fatal	Unknown (2nd Aircraft)
363.	January 4, 1960	T-33A	Luftwaffe	Unknown	Unknown
364.	1960	T-33A	Cuban AF	Non-Fatal	Engine Failure (Flameout)
365.	November 4, 1959	T-33A	USAF	Fatal	Mid-Air
366.	November 3, 1959	T-33A	USAF	Fatal	Mid-Air
367.	November 3, 1959	T-33A	USAF	Non-Fatal	Mid-Air

#	Date	Version	Operator	Severity	Probable Cause and Remarks
368.	October 19, 1959	T-33A	USAF	Unknown	Unknown
369.	October 14, 1959	T-33A	USAF	Non-Fatal	Loss of Engine Power – Tip Tanks Hit House
370.	September 15, 1959	T-33A	USAF	Fatal (2)	Unknown
371.	August 5, 1959	T-33A	USAF	Unknown	Unknown
372.	July 22, 1959	T-33A	JSDAF	Unknown	Unknown
373.	July 21, 1959	T-33A	Luftwaffe	Unknown	Unknown
374.	July 16, 1959	T-33A	Luftwaffe	Unknown	Unknown
375.	July 15, 1959	T-33A	Portuguese AF	Unknown	Unknown
376.	June 25, 1959	T-33A	USAF	Unknown	unknown
377.	June 2, 1959	T-33A	Luftwaffe	Unknown	Unknown
378.	May 20, 1959	T-33A	JSDAF	Non-Fatal	LOC
379.	May 20, 1959	T-33A	JSDAF	Non-Fatal	Lost at Sea
380.	May 19, 1959	T-33A	JSDAF	Fatal	Engine Failure
381.	May 15, 1959	T-33A	USAF	Unknown	Unknown
382.	May 13, 1959	T-33A	Belgian AF	Non-Fatal	Mid-Air (1st Aircraft)
383.	May 13, 1959	T-33A	Belgian AF	Fatal	Mid-Air (2nd Aircraft)
384.	May 11, 1959	T-33A	JSDAF	Fatal	Unknown
385.	April 25, 1959	T-33A	Spanish AF	Fatal	Mid-Air
386.	April 22, 1959	T-33A	JSDAF	Non-Fatal	Unknown
387.	April 15, 1959	TV2	USN	Non-Fatal	Flight Controls Failure
388.	March 31, 1959	T-33A	USAF	Unknown	Unknown
389.	March 9, 1959	T-33A	USAF	Non-Fatal	Engine Failure (Flameout)
390.	March 7, 1959	T-33A	USAF	Non-Fatal	Ground Oxygen Fire
391.	March 1, 1959	T-33	French AF	Unknown	Unknown
392.	January 30, 1959	T-33A	USAF	Non-Fatal	Mechanical Failure (2 Ejections)
393.	January 24, 1959	RT-33A	Dutch AF	Unknown	Unknown
394.	January 22, 1959	T-33A	USAF	Unknown	Unknown
395.	January 10, 1959	T-33A	USAF	Unknown	Unknown
396.	January 9, 1959	T-33A	USAF	Unknown	Unknown
397.	January 6, 1959	T-33A	USAF	Unknown	Unknown
398.	December 9, 1958	T-33	French AF	Unknown	Unknown
399.	November 12, 1958	T-33A	USAF	Unknown	Unknown
400.	November 7, 1958	T-33A	Luftwaffe	Unknown	Unknown
401.	October 22, 1958	T-33A	USAF	Non-Fatal	Engine Flameout
402.	October 13, 1958	T-33A	USAF	Unknown	Unknown
403.	October 1958	T-33A	Portuguese AF	Nonfatal	Gear-Up Landing (Mechanical)
404.	September 27, 1958	T-33A	USAF	Unknown	Unknown
405.	September 22, 1958	T2V	USN	Non-Fatal	Engine Failure
406.	September 9, 1958	T-33 Mk.3	RCAF	Non-Fatal	Landing Accident
407.	August 19, 1958	T-33A	Luftwaffe	Unknown	Unknown
408.	August 11, 1958	T-33A	Dutch AF	Unknown	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
409.	August 1, 1958	T-33A	JSDAF	Non-Fatal	Unknown
410.	July 3, 1958	T-33A	Dutch AF	Unknown	Unknown
411.	June 13, 1958	T-33A	USAF	Fatal (2)	Mid-Air
412.	June 6, 1958	T-33A	USAF	Unknown	Unknown
413.	May 20, 1958	T-33A	USAF	Fatal (12)	Mid-Air (Capital Viscount)
414.	April 30, 1958	T-33A	USAF	Unknown	Unknown
415.	April 17, 1958	T-33A	Norwegian AF	Fatal	Acrobatics
416.	April 17, 1958	T-33A	Luftwaffe	Unknown	Unknown
417.	April 9, 1958	T-33A	USAF	Unknown	Unknown
418.	March 26, 1958	T-33A	USAF	Fatal	Unknown
419.	January 20, 1958	T-33A	USAF	Unknown	Unknown
420.	January 8, 1958	T-33 Mk.3	RCAF	Non-Fatal	Gear-Up Landing
421.	1958	T-33A	Cuban AF	Fatal	Ordinance Detonation on the Ground
422.	1958	T-33A	USAF	Unknown	Unknown
423.	December 4, 1957	T-33A	USAF	Non-Fatal	Engine Failure
424.	November 30, 1957	T-33A	USAF	Non-Fatal	Unknown
425.	November 21, 1957	T-33A	Luftwaffe	Unknown	Unknown
426.	October 28, 1957	T-33A	Luftwaffe	Unknown	Unknown
427.	September 30, 1957	T-33A	JSDAF	Non-Fatal	Unknown
428.	September 19, 1957	T-33A	JSDAF	Non-Fatal	Unknown
429.	July 15, 1957	T-33A	Belgian AF	Unknown	Unknown
430.	July 3, 1957	T-33A	Dutch AF	Non-Fatal	Mid-Air (1st Aircraft)
431.	July 3, 1957	T-33A	Dutch AF	Non-Fatal	Mid-Air (2nd Aircraft)
432.	July 2, 1957	T-33A	USAF	Unknown	Unknown
433.	July 2, 1957	T-33A	Luftwaffe	Unknown	Unknown
434.	July 2, 1957	RT-33A	Turkish AF	Fatal	Unknown
435.	July 1, 1957	T-33A	UISAF	Unknown	Unknown
436.	June 9, 1957	T-33 Mk.3	RCAF	Fatal	Low Altitude Acrobatics
437.	June 4, 1957	T-33A	JSDAF	Fatal (2)	Engine Failure
438.	May 25, 1957	T-33A	USAF	Non-Fatal	In-Flight Canopy Failure
439.	May 25, 1957	T-33A	Dutch AF	Non-Fatal	Engine Failure
440.	May 9, 1957	T-33A	Dutch AF	Unknown	Unknown
441.	March 26, 1957	T-33A	USAF	Fatal	Mid-Air
442.	March 22, 1957	T-33A	Belgian AF	Non-Fatal	Fuel Leak/Asymmetric Landing
443.	February 28, 1957	T-33A	Dutch AF	Unknown	Unknown
444.	February 6, 1957	T-33A	Dutch AF	Unknown	Unknown
445.	January 28, 1957	T-33A	Saudi AF	Unknown	Unknown
446.	January 16, 1957	T-33A	USAF	Fatal	Landing Approach
447.	1957	T-33A	JSDAF	Fatal	Landing Approach (Weather)
448.	November 21, 1956	T-33A	USAF	Fatal	Weather on Approach
449.	November 15, 1956	TV-2	USN	Fatal	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
450.	October 7, 12956	TV-2	USN	Fatal	CFIT
451.	October 6, 1956	T-33A	USAF	Fatal	Overrun (Hits Civilian Car)
452.	September 29, 1956	T-33A	JSDAF	Non-Fatal	Unknown
453.	September 27, 1956	T-33A	RCAF	Unknown	Unknown
454.	September 22, 1956	T-33A	Dutch AF	Unknown	Unknown
455.	September 15, 1956	T-33A	USAF	Fatal	LOC on Takeoff (Over Rotation)
456.	September 10, 1956	T-33A	USAF	Fatal (2)	Engine Fire on Takeoff
457.	September 7, 1956	T-33A	USAF	Fatal	Unknown
458.	August 24, 1956	T-33A	USAF	Unknown	Unknown
459.	August 16, 1956	T-33A	JSDAF	Non-Fatal	Unknown
460.	July 8, 1956	T-33A	USAF	Fatal	Fuel Starvation
461.	May 15, 1956	AT-33A	USAF	Unknown	Unknown
462.	May 12, 1956	T-33A	USAF	Non-Fatal	Ejection
463.	December 30, 1955	T-33A	RCAF	Unknown	Unknown
464.	October 19, 1955	T-33A	Luftwaffe	Unknown	Landing Accident
465.	October 15, 1955	T-33A	USAF	Fatal (2)	Crashed After Takeoff
466.	August 31, 1955	T-33A	USAF	Fatal	Possible Runway Trim
467.	September 1955	T-33A	USAF	Fatal(2)	Unknown
468.	July 30, 1955	T-33A	USAF	Unknown	Unknown
469.	May 15, 1955	T-33A	USAF	Fatal (2)	LOC (Ocean)
470.	May 13, 1955	T-33A	USAF	Unknown	Mid-Air with Northrop N-69
471.	May 5, 1955	T-33A	USAF	Unknown	Unknown
472.	April 22, 1955	T-33A	French AF	Non-Fatal	Engine Flameout
473.	April 3, 1955	T-33 Mk.3	RCAF	Fatal (2)	Mechanical Failure
474.	February 15, 1955	T-33A	Dutch AF	Unknown	Unknown
475.	February 15, 1955	T-33A	USAF	Fatal (2)	Night Flight
476.	February 11, 1955	T-33A	Dutch AF	Unknown	Unknown
477.	1955	T-33A	Dutch AF	Unknown	Unknown
478.	November 29, 1954	T-33A	USAF	Unknown	Unknown
479.	October 28, 1954	T-33A	USAF	Fatal	Mid-Air
480.	October 28, 1954	T-33A	USAF	Unknown	Mid-Air (2nd Aircraft)
481.	October 28, 1954	T-33A	USAF	Unknown	Mid-Air (3rd Aircraft)
482.	October 17, 1954	T-33A	USAF	Fatal	Unknown
483.	October 11, 1954	T-33A	USAF	Unknown	Unknown
484.	October 9, 1954	T-33A	USAF	Unknown	Engine Failure (Flameout)
485.	August 1954	T-33A	Italian AF	Unknown	Unknown
486.	July 4, 1954	T-33A	USAF	Fatal	Unknown
487.	June 22, 1954	T-33A	Dutch AF	Unknown	Unknown
488.	June 9, 1954	T-33A	Dutch AF	Unknown	Unknown
489.	June 1, 1954	T-33 Mk.3	RCAF	Fata;	LOC - Spiral
490.	April 16, 1954	T-33A	RCAF	Unknown	Unknown

#	Date	Version	Operator	Severity	Probable Cause and Remarks
491.	March 18, 1954	T-33A	Italian AF	Unknown	Unknown
492.	January 30, 1954	T-33A	USAF	Fatal	Airborne Uncommanded Ejection
493.	January 27, 1954	T-33A	USAF	Unknown	Unknown
494.	December 5, 1953	TV-2	USMC	Unknown	Unknown
495.	October 25, 1953	TV-2	USN	Fatal	Weather
496.	September 9, 1953	T-33A	RCAF	Unknown	Unknown
497.	May 18, 1953	T-33A	USAF	Unknown	Unknown
498.	May 12, 1953	T-33A	USAF	Fatal	Unknown
499.	April 7, 1953	T-33A	USAF	Fatal (2)	LOC/Lost at Sea
500.	January 23, 1953	EQT-33A	USAF	Unknown	Unknown
501.	January 21, 1953	T-33A	USAF	Unknown	Unknown
502.	January 9, 1953	T-33A	USAF	Unknown	Unknown
503.	November 20, 1952	T-33A	USAF	Fatal	Crashed at Sea
504.	September 6, 1952	T-33A	USAF	Fatal	Engine Fire - LOC
505.	July 31, 1952	T-33A	French AF	Unknown	Landing Accident
506.	July 27, 1952	T-33	French AF	Unknown	Unknown
507.	July 5, 1952	T-33A	USAF	Fatal	Unknown
508.	March 6, 1952	T-33A	USAF	Fatal (2)	Stall on Final
509.	November 11, 1951	T-33A	French AF	Unknown	Landing Accident
510.	November 2, 1951	T-33A	USAF	Unknown	Unknown
511.	October 31, 1951	T-33A	USAF	Unknown	Unknown
512.	October 4, 1951	T-33A	USAF	Unknown	Unknown
513.	September 13, 1951	T-33A	USAF	Unknown	Unknown
514.	September 3, 1951	T-33A	USAF	Unknown	Unknown
515.	August 21, 1951	T-33A	USAF	Unknown	Unknown
516.	August 7, 1951	T-33A	USAF	Fatal (2)	Unknown
517.	July 10, 1951	T-33A	USAF	Unknown	Unknown
518.	July 6, 1951	T-33A	USAF	Unknown	Unknown
519.	June 29, 1951	T-33A	USAF	Unknown	Unknown
520.	June 12, 1951	T-33A	USAF	Unknown	Unknown
521.	May 17, 1951	T-33A	USAF	Unknown	Unknown
522.	May 16, 1951	T-33A	USAF	Fatal (2)	Landing Accident
523.	Spring 1951	T-33A	USAF	Non-Fatal	Fire in Nose Compartment (Hazmat Cargo)
524.	May 1, 1951	T-33A	USAF	Unknown	Landing Accident
525.	April 30, 1951	T-33A	USAF	Unknown	Unknown
526.	April 19, 1951	T-33A	USAF	Unknown	Unknown
527.	April 8, 1951	EQT-33A	USAF	Unknown	Landing Accident
528.	March 29, 1951	T-33A	USAF	Unknown	Unknown
529.	February 13, 1951	T-33A	USAF	Unknown	Unknown
530.	February 5, 1951	T-33A	USAF	Unknown	Unknown
531.	February 1, 1951	TV-2	USN	Unknown	Landing Accident

#	Date	Version	Operator	Severity	Probable Cause and Remarks
532.	January 28, 1951	T-33A	USAF	Fatal (2)	Unknown
533.	January 16, 1951	T-33A	USAF	Unknown	Unknown
534.	January 13, 1951	T-33A	USAF	Unknown	Unknown
535.	December 15, 1950	TO-2	USN	Non-Fatal	Mechanical Failure
536.	November 19, 1950	T-33A	USAF	Unknown	Unknown
537.	November 13, 1950	T-33A	USAF	Unknown	Unknown
538.	November 16, 1950	TF-80B	USAF	Non-Fatal	Engine Fire
539.	October 16, 1950	T-33A	USAF	Unknown	Unknown
540.	September 25, 1950	T-33A	USAF	Unknown	Unknown
541.	July 13, 1950	T-33A	USAF	Unknown	Unknown
542.	June 13, 1950	T-33A	USAF	Non-Fatal	Engine Failure on Takeoff
543.	May 18, 1950	T-33A	USAF	Unknown	Unknown
544.	March 14, 1950	T-33A	USAF	Unknown	Unknown
545.	February 19, 1950	T-33A	USAF	Fatal	Structural Failure
546.	February 8, 1950	T-33A	USAF	Non-Fatal	Fuel Starvation
547.	January 11, 1950	T-33A	USAF	Fatal (2)	Unknown
548.	September 9, 1948	TF-80C	USAF	Fatal	Landing Accident


OFF
LOW
HIGH
RADIO CALL
DANGER
DO NOT LET Engine
SPEED EXCEED 100%
ALT
D.C.ELEC.
4 MIN TURN
CLIMB
EXHAUST
DIM
AILERON TAB
WING FLAP
FLAPS
WARNING
BOMB SALVO SWITCH
VOL.
PRESET
MANUAL
FREQUENCY
POWER ON
VOLUME
VHF NAV
MODE 1
MODE 3
MASTER
MODE 2
MODE 3
I/P